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GREENLEAF'S PRIMARY ARITHMETIC.

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GREENLEAF'S MENTAL ARITHMETIC,

NEW EDITION, REVISED AND ENLARGED.

MENTAL ARITHMETIC,

UPON THE

INDUCTIVE PLAN.

DESIGNED FOR

PRIMARY AND INTERMEDIATE SCHOOLS.

By BENJAMIN GREENLEAF, A. M.,

AUTHOR OF THE "NATIONAL ARITHMETIC," ETC.

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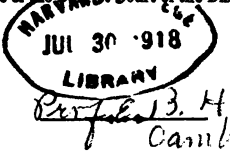

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PREFACE.

The design of the author, in revising and enlarging this work, has been, to present to the mind of the learner a more complete collection of intellectual exercises than was contained in former editions. The object of the work is to teach the pupil how to *think*, and to enable him, by an almost imperceptible gradation of thought, to advance from the simplest forms of reasoning to the more vigorous exercise of the mind.

Hence, no arbitrary *rules* have been introduced, and only such hints and suggestions, with occasional formulæ of reasoning, as were considered necessary for the profitable study of the lessons.

A scholar should not be satisfied with *results* merely; — he should know the *conditions*, upon which those results depend, and be able, from those conditions, to give a *reason* for the results.

Copious practical exercises have been introduced, in connection with the abstract questions, particularly in connection with Fractions, that the pupil may see the application of numbers to the common business of life.

A larger amount of matter, it is believed, will be found in connection with the tables of money, weights, and measures, than is contained in any other similar work. There are also frequent lessons for general exercise, to refresh the mind in the preceding principles, and test the proficiency that the pupil is making as he advances.

Several pages of Written Arithmetic have been introduced, at the close of the work, which can be used while the pupil is advancing in the Mental department, or omitted until that is finished.

In most schools, however, pupils commence Written Arithmetic before they finish the more difficult parts of the Mental department. But in *no case* should the pupil be allowed the use of the slate in the performance of *intellectual* exercises.

It is the opinion of the author, that a thorough understanding of this work will fully prepare the mind for the profitable study of the second book of the series.

B. GREENLEAF.

Bradford Seminary, November, 1851.

SUGGESTIONS TO TEACHERS.

IT is respectfully suggested, that, in using this work, the pupil should be taught, from the *commencement*, to give a *clear Analysis* of every question he performs.

Many teachers permit their pupils to use their books in the class, by reading each question before solving it.

Other teachers prefer to read the questions themselves to the *whole class*, and then call upon some one for a solution. By the former method of recitation, the class *appears* better, and makes a finer *show* to the spectator. By the latter mode, the attention of each member of the class is gained in every question, and more earnestness of thought elicited.

The practice of permitting a class to answer *in concert*, whereby the palm of scholarship is carried off by the most boisterous, cannot be too highly censured.

With very small children, however, the multiplication table may be repeated in concert, care being taken to avoid an unpleasant "*sing-song*" tone, in the exercise.

A sufficient number of notes for the teacher, and explanations for the scholar, are introduced, to lead to a profitable use of the work.

B. G.

MENTAL ARITHMETIC.

ADDITION.

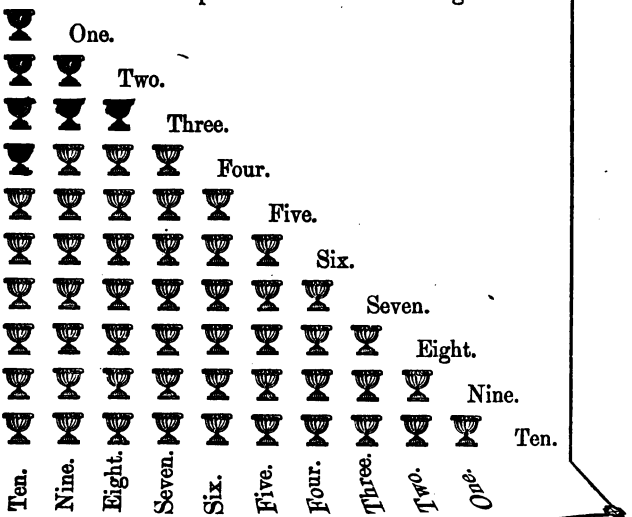
LESSON I.

1. If you wish to know how many fingers you have on your right hand, what must you do? Answer. — I should count them.

2. What, then, is counting? Ans. — Finding the number of things.

3. When you count, with what number do you always commence?

4. Count the cups in each of the following rows.



5. Which is the smallest number of cups in any one of the rows?

6. Which is the largest number of cups in any one of the rows?

7. Commence at the bottom of the rows, and count the cups upward.

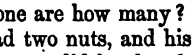
8. What is the largest number that you have counted?

9. If you had one ball in your right hand, and one in your left hand, how many would you have in both hands?

10. William had one peach, and his father gave him one more; how many peaches then had William?

11. One and one are how many?

12. George had two nuts, and his sister gave him one more; how many nuts did he then have?

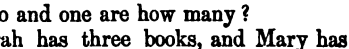


13. Two and one are how many?

14. Sarah has three books, and Mary has one book; how many books have they both?

15. Three and one are how many?

16. If you had four cents, and your mother should give you another, how many cents would you then have?



17. Four and one are how many?

18. Lucy found five pins, and Mary found one pin: how many did both find?

19. Five and one are how many?

20. Thomas recited six perfect lessons, and his brother only one; how many did both recite?

21. Six and one are how many?

22. If you had seven chestnuts, and I should give you one more, how many chestnuts would you then have?

23. Seven and one are how many?

24. Rufus paid eight cents for a fishing-line, and one cent for a fish-hook; how many cents did he pay for both?

25. Eight and one are how many?

26. Paid nine dollars for a table, and one dollar for a chair; how many dollars did I pay for both?

27. Nine and one are how many?

LESSON II.

1. If you had two cherries, and I should give you two more, how many cherries would you then have?

2. Two and two are how many?

3. James has three nuts, and Charles has two nuts; how many nuts have they both?

4. Three and two are how many?

5. A man sold a pig for three dollars, and a sheep for three dollars; how many dollars did he receive for both?

6. Three and three are how many?

7. Mary has three books, and Margaret has four books; how many books have they both?

8. Three and four are how many?

9. Stephen caught four fishes, and John caught five fishes; how many did they both catch?

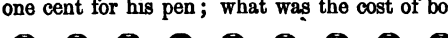
10. Four and five are how many?

11. Gave six cents for paper, and four cents for quills; how many cents did I pay for both?

12. Six and four are how many?

13. Bought a barrel of flour for seven dollars, and a barrel of apples for two dollars; how much was given for both?

14. Albert gave nine cents for his writing-book, and one cent for his pen; what was the cost of both?



15. Nine and one are how many?

16. Four and five are how many?

17. Three and five are how many?

18. Six and three are how many?

19. How many are four and two and one?

20. How many are five and three and one?

21. How many are six and two and one?

22. How many are seven and two and one?

23. How many are eight and one and one?

LESSON III.

A. — Instead of expressing numbers by words, the pupil will find it convenient to make use of little characters called figures. Sometimes the letters of the alphabet are used to express numbers. They are used to denote the number of the lessons in this book.

The figures are called Arabic characters, because they were first used by the Arabs.

The letters are called Roman characters, because they were used by the Romans.

B. — By learning the following table, the pupil will become familiar with the Arabic and the Roman characters.

	Printed Arabic Figures.	Written Figures.	Roman.
One is written	1	1	I.
Two is written	2	2	II.
Three,	3	3	III.
Four,	4	4	IV.
Five,	5	5	V.
Six,	6	6	VI.
Seven,	7	7	VII.
Eight,	8	8	VIII.
Nine,	9	9	IX.
Ten,	10	10	X.
Eleven,	11	11	XI.
Twelve,	12	12	XII.
Thirteen,	13	13	XIII.
Fourteen,	14	14	XIV.
Fifteen,	15	15	XV.
Sixteen,	16	16	XVI.
Seventeen,	17	17	XVII.
Eighteen,	18	18	XVIII.
Nineteen,	19	19	XIX.
Twenty,	20	20	XX.
Twenty-one,	21	21	XXI.
Twenty-two,	22	22	XXII.
Twenty-three,	23	23	XXIII.

	Printed Arabic Figures.	Written Figures.	Roman.
Twenty-four,	24	24	XXIV.
Twenty-five,	25	25	XXV.
Twenty-six,	26	26	XXVI.
Twenty-seven,	27	27	XXVII.
Twenty-eight,	28	28	XXVIII.
Twenty-nine,	29	29	XXIX.
Thirty,	30	30	XXX.
Thirty-one, &c.,	31	31	XXXI.
Forty,	40	40	XL.
Forty-one, &c.,	41	41	XLI.
Fifty,	50	50	L.
Fifty-one, &c.,	51	51	LI.
Sixty,	60	60	LX.
Sixty-one, &c.,	61	61	LXI.
Seventy,	70	70	LXX.
Seventy-one, &c.,	71	71	LXXI.
Eighty,	80	80	LXXX.
Eighty-one, &c.,	81	81	LXXXI.
Ninety,	90	90	XC.
Ninety-one, &c.,	91	91	XCI.
One hundred,	100	100	C.
Five hundred,	500	500	D.
One thousand,	1000	1000	M.

LESSON IV.

A. — Let the pupil write upon a slate the following numbers, in the Arabic characters.

Six. Nine. Ten. Twelve. Fourteen. Sixteen. Eighteen. Nineteen. Twenty-one. Twenty-four. Twenty-nine. Thirty-two. Forty-four. Fifty-seven. Sixty-four. Seventy-five. Eighty-six. Eighty-nine. Ninety-two. Ninety-five. Ninety-seven. Ninety-nine. One hundred. Five hundred. One thousand.

B. — Write, in Roman letters, the following numbers.

One. Four. Seven. Nine. Eleven. Fourteen. Eighteen. Twenty. Twenty-five. Twenty-nine. Thirty. Thirty-seven. Forty-six. Fifty. Fifty-one. Sixty. Sixty-four. Seventy. Seventy-six. Eighty. Eighty-nine. Ninety. Ninety-three. One hundred.

LESSON V.

A. — By learning the following table, the pupil will find great assistance in future lessons.

ADDITION TABLE.

2	and	0	are	2	2	and	9	are	11	3	and	4	are	7
2	and	1	are	3	2	and	10	are	12	3	and	5	are	8
2	and	2	are	4	2	and	11	are	13	3	and	6	are	9
2	and	3	are	5	2	and	12	are	14	3	and	7	are	10
2	and	4	are	6						3	and	8	are	11
2	and	5	are	7	3	and	0	are	3	3	and	9	are	12
2	and	6	are	8	3	and	1	are	4	3	and	10	are	13
2	and	7	are	9	3	and	2	are	5	3	and	11	are	14
2	*and*	*8*	*are*	*10*	*3*	*and*	*3*	*are*	*6*	3	and	12	are	15

4	and	0	are	4	5	and	0	are	5	6	and	0	are	6
4	and	1	are	5	5	and	1	are	6	6	and	1	are	7
4	and	2	are	6	5	and	2	are	7	6	and	2	are	8
4	and	3	are	7	5	and	3	are	8	6	and	3	are	9
4	and	4	are	8	5	and	4	are	9	6	and	4	are	10
4	and	5	are	9	5	and	5	are	10	6	and	5	are	11
4	and	6	are	10	5	and	6	are	11	6	and	6	are	12
4	and	7	are	11	5	and	7	are	12	6	and	7	are	13
4	and	8	are	12	5	and	8	are	13	6	and	8	are	14
4	and	9	are	13	5	and	9	are	14	6	and	9	are	15
4	and	10	are	14	5	and	10	are	15	6	and	10	are	16
4	and	11	are	15	5	and	11	are	16	6	and	11	are	17
4	and	12	are	16	5	and	12	are	17	6	and	12	are	18

7	and	0	are	7	8	and	0	are	8	9	and	0	are	9
7	and	1	are	8	8	and	1	are	9	9	and	1	are	10
7	and	2	are	9	8	and	2	are	10	9	and	2	are	11
7	and	3	are	10	8	and	3	are	11	9	and	3	are	12
7	and	4	are	11	8	and	4	are	12	9	and	4	are	13
7	and	5	are	12	8	and	5	are	13	9	and	5	are	14
7	and	6	are	13	8	and	6	are	14	9	and	6	are	15
7	and	7	are	14	8	and	7	are	15	9	and	7	are	16
7	and	8	are	15	8	and	8	are	16	9	and	8	are	17
7	and	9	are	16	8	and	9	are	17	9	and	9	are	18
7	and	10	are	17	8	and	10	are	18	9	and	10	are	19
7	and	11	are	18	8	and	11	are	19	9	and	11	are	20
7	and	12	are	19	8	and	12	are	20	9	and	12	are	21

10	and	0	are	10	10	and	7	are	17	10	and	14	are	24
10	and	1	are	11	10	and	8	are	18	10	and	15	are	25
10	and	2	are	12	10	and	9	are	19	10	and	16	are	26
10	and	3	are	13	10	and	10	are	20	10	and	17	are	27
10	and	4	are	14	10	and	11	are	21	10	and	18	are	28
10	and	5	are	15	10	and	12	are	22	10	and	19	are	29
10	and	6	are	16	10	and	13	are	23	10	and	20	are	30

11	and	0	are	11	11	and	5	are	16	11	and	10	are	21
11	and	1	are	12	11	and	6	are	17	11	and	11	are	22
11	and	2	are	13	11	and	7	are	18	11	and	12	are	23
11	and	3	are	14	11	and	8	are	19	11	and	13	are	24
11	and	4	are	15	11	and	9	are	20	11	and	14	are	25

12	and	0	are	12	12	and	5	are	17	12	and	10	are	22
12	and	1	are	13	12	and	6	are	18	12	and	11	are	23
12	and	2	are	14	12	and	7	are	19	12	and	12	are	24
12	and	3	are	15	12	and	8	are	20	12	and	13	are	25
12	and	4	are	16	12	and	9	are	21	12	and	14	are	26

To THE TEACHER. — The pupil, having learned the preceding table in its regular order, should be thoroughly exercised in every variety of combination of numbers, without reference to order.

To facilitate this exercise, we subjoin the following lesson.

LESSON VI.

A. — THE scholar must learn this lesson, if possible, without looking at the table.

1.	2	and	1	are	how	many?	2	and	3?
2.	2	and	6	are	how	many?	2	and	9?
3.	2	and	7	are	how	many?	2	and	10?
4.	3	and	3	are	how	many?	3	and	4?
5.	3	and	2	are	how	many?	3	and	8?
6.	4	and	6	are	how	many?	4	and	5?
7.	4	and	9	are	how	many?	4	and	10?
8.	5	and	6	are	how	many?	5	and	4?
9.	5	and	8	are	how	many?	5	and	12?
10.	6	and	3	are	how	many?	6	and	6?
11.	6	and	5	are	how	many?	6	and	12?
12.	7	and	3	are	how	many?	7	and	6?

13. 7 and 8 are how many? 7 and 10?
14. 8 and 4 are how many? 8 and 6?
15. 8 and 10 are how many? 8 and 3?
16. 9 and 4 are how many? 9 and 2?
17. 9 and 5 are how many? 9 and 12?
18. 10 and 2 are how many? 10 and 4?
19. 10 and 7 are how many? 10 and 6?
20. 11 and 1 are how many? 11 and 4?
21. 11 and 9 are how many? 11 and 4?
22. 12 and 2 are how many? 12 and 4?
23. 12 and 9 are how many? 12 and 8?

LESSON VII.

ADD the following numbers on the slate:

2	4	7	6	8	9	10	12
3	2	3	7	8	5	4	6
14	14	12	10	16	14	18	24
12	14	12	10	12	13	11	21

LESSON VIII.

1. GAVE 3 cents to James, 4 cents to Thomas, and 2 cents to Jane; how many cents did they all receive?
2. Gave 4 nuts to one boy, 2 to another, and 4 to another; how many nuts were given to the 3 boys?
3. John has 3 marbles, Samuel has 5 marbles, and Jacob has 4 marbles; how many marbles have they all?

4. Jane has 9 cents, Mary 4 cents, and Lydia 3 cents; how many cents have they all?

5. Bought a horse for 10 dollars, and a harness for 5 dollars; what was the cost of both?

6. Gave 12 cents for a book, 6 cents for paper, and 4 cents for a pencil; how many cents did I pay for the whole?

7. Bought a pound of sugar for 9 cents, a pound of raisins for 7 cents, and an ounce of nutmegs for 6 cents; what was the whole cost?

8. John has 10 marbles, Samuel 4, Luke 3, and Matthew 5; how many marbles have they all?

9. Lucy bought some pins for 12 cents, some thread for 8 cents, some tape for 6 cents, and some cotton for 9 cents; what was the cost of all the articles?

10. Bought a barrel of flour for 6 dollars, a barrel of apples for 3 dollars, and a keg of molasses for 8 dollars; what was the whole cost?

11. Frank put 4 cents into his money-box the first week, 6 cents the second week, and 9 cents the third week; how many cents were in the box at the end of three weeks?

12. If a man give 6 dollars for a sleigh, 3 dollars for a harness, and 5 dollars for a saddle, how much would he give for all?

13. A lady bought some silk for 7 dollars, a muff for 4 dollars, a pair of gloves for 1 dollar, a shawl for 10 dollars, and a bonnet for 6 dollars; how many dollars did she pay away?

14. James is 4 years old, Edward 6, Charles 8, and Ann 10 years old; what is the sum of their ages?

15. A man bought a horse for 12 dollars, a cow for 9 dollars, a sheep for 5 dollars, and a pig for 2 dollars; what was the whole cost?

16. Bought a plow for 10 dollars, a cart for 7 dollars, and a harness for 10 dollars; what was the cost of the whole?

LESSON IX.

1. A MAN bought an axe for 3 dollars, a load of wood for 5 dollars, and a spade for 1 dollar; what was the cost of the whole?

2. A lady purchased some silk for 12 dollars, and a shawl for 5 dollars; how much did she give for both?

3. Bought 10 bales of cotton, 6 bags of rice, and 2 boxes of sugar; what was the number of articles purchased.

4. A gentleman gave 12 dollars for a watch, 7 dollars for a chain, and 2 dollars for a key; how many dollars did he pay for the whole?

5. If a cart is worth 11 dollars, a saddle 9 dollars, and a whip 1 dollar, what is the value of the whole?

6. Gave 12 dollars for a harness, 6 dollars for a buffalo-robe, and 2 dollars for a bridle; how much did the whole cost?

7. A lad found 12 chestnuts under one tree, 10 under another, and 8 under another; how many did he find in all?

8. A shoe-dealer sold at one time 13 cases of shoes, at another time 10, and at another time only 4; how many cases did he sell in all?

9. Vermont has 13 counties, Delaware 3, and Rhode Island 3; how many counties have the three states?

10. A man gave 14 dollars for a piece of land; it cost him 10 dollars to fence it, and 2 dollars to have it plowed; what was the whole cost?

11. Three men buy a carriage together; the first pays 15 dollars, the second 10 dollars, and the third 7 dollars; how much did they all pay?

12. Charles gave 16 cents for an arithmetic, 10 cents for a grammar, 8 cents for a writing-book, and 2 cents for a pencil; what was the cost of the whole?

13. Edward bought some cloth for 18 cents, some

buttons for 12 cents, and some thread for 6 cents; what was the whole cost?

14. William has 15 cents for his holiday gift, Thomas has 12 cents, Henry 10 cents, and Frank 8 cents; how much have they all? 15 and 12 and 10 and 8 are how many?

15. Lucy had 17 pins in her cushion, and put in 10 more; how many had she then in the cushion?

16. I gave 18 apples to Peter, and had 5 left; how many did I have at first?

17. Charles received 19 peaches from his brother, and 10 from his cousin; how many peaches did he then have?

18. Rufus had 19 cents on his birthday, and 12 at Christmas; how many cents did he have in all?

19. Farmer Jones raised 20 bushels of oats, 5 bushels of corn, and 10 bushels of wheat; how many bushels in all did he raise?

20. Peter bought 20 nuts at one time, 11 at another time, and 9 at another; how many nuts did he buy in all?

LESSON X.

1. A MAN sold a barrel of flour for 7 dollars, a barrel of pork for 5 dollars, a firkin of butter for 3 dollars, and a box of sugar for 6 dollars; how many dollars did he receive for the whole? 7 and 5 and 3 and 6 are how many?

2. Three boys, James, Henry and Charles, went fishing; James caught 10 fishes, Henry 8, and Charles 6; how many did they all catch? 10 and 8 and 6 are how many?

3. Mary has 12 books, Susan has 10 books, Eliza has 7 books, and Ann has 5 books; how many books have they all? 12 and 10 and 7 and 5 are how many?

4. Joseph, Thomas and Albert, went to pick berries; Joseph picked 14 quarts, Thomas picked 12 quarts, and Albert picked 10 quarts; how many quarts did they all pick? 14 and 12 and 10 are how many?

5. How many are 4 and 6 and 3? 4 and 7 and 4? 4 and 8 and 5? 4 and 9 and 3? 4 and 10 and 1? 4 and 4 and 9? 4 and 6 and 8? 4 and 3 and 9?

6. How many are 4 and 5 and 5? 3 and 9 and 6? 3 and 8 and 8? 4 and 9 and 1? 4 and 1 and 9? 5 and 5 and 4? 5 and 4 and 7? 7 and 6 and 1?

7. How many are 7 and 1 and 7? 7 and 4 and 5? 6 and 1 and 9? 6 and 3 and 7? 7 and 5 and 4? 7 and 7 and 4? 7 and 8 and 2? 6 and 7 and 9? 9 and 9 and 1? 7 and 7 and 7? 4 and 7 and 9? 2 and 8 and 4? 7 and 1 and 9?

8. How many are 9 and 1 and 8? 9 and 3 and 9? 7 and 8 and 8? 4 and 9 and 9? 7 and 7 and 3? 9 and 8 and 9? 9 and 9 and 9? 9 and 7 and 8? 6 and 8 and 4? 5 and 7 and 9? 7 and 4 and 2? 3 and 9 and 5? 2 and 6 and 7? 8 and 1 and 4? 5 and 8 and 5? 3 and 9 and 6? 9 and 4 and 7?

9. How many are 20 and 4 and 2? 20 and 4 and 3? 25 and 6 and 7? 25 and 8 and 9? 25 and 6 and 10? 30 and 4 and 2? 30 and 4 and 3? 34 and 4 and 6? 34 and 7 and 2? 34 and 2 and 4?

10. How many are 40 and 4 and 4? 40 and 4 and 3? 40 and 5 and 2? 40 and 8 and 9? 45 and 2 and 7? 46 and 4 and 8? 49 and 2 and 7? 49 and 9 and 10? 49 and 7 and 7?

11. How many are 50 and 2 and 4? 50 and 10 and 6? 60 and 4 and 2? 60 and 9 and 8? 64 and 4 and 4? 70 and 2 and 4? 70 and 10 and 10? 80 and 9 and 1? 80 and 7 and 3?

12. How many are 65 and 3? 65 and 4? 65 and 7? 75 and 4? 75 and 5? 75 and 7? 85 and 4? 85 and 6? 85 and 9? 95 and 7?

LESSON XI.

1. I HAVE a number of pears, which I wish to give to four little boys; to the first I give 12, to the second I give 9, to the third I give 7, and to the fourth I give 6; how many do I give to all?

2. 12 and 9 and 7 and 6 are how many?

3. A farmer kept his sheep in 4 pens; in the first there were 20, in the second there were 10, in the third there were 8, and in the fourth there were 6; how many sheep did he have?

4. 20 and 10 and 8 and 6 are how many?

5. My book-case has 4 shelves; the first shelf contains 16 books, the second contains 10 books, the third contains 8 books, and the fourth contains 6 books; how many books are there in the book-case?

6. 16 and 10 and 8 and 6 are how many?

7. A man started on a journey; the first day he travelled 30 miles, the second day 10 miles, and the third day 9 miles; how many miles did he travel?

8. 30 and 10 and 9 are how many?

9. In a certain school, 25 of the scholars read, 10 of them study grammar, 8 of them write, and 6 study geography; how many scholars are there in the school?

10. 25 and 10 and 8 and 6 are how many?

EXERCISES FOR THE SLATE.

4	6	3	8	5	6	9
7	8	7	6	4	5	8
3	4	9	7	9	4	7
10	12	16	19	18	27	
9	4	12	10	11	21	

SUBTRACTION.

LESSON XII.

1. If you have 2 apples, and give 1 of them to your brother, how many apples will you have left? Why? Ans. Because, if I take 1 apple from 2 apples, I shall have one apple left.

2. What do you do, to find how many apples you have left? Ans. I take the number of apples that I wish to give away, from the whole number of apples that I have, and then see how many I have left.

3. What is this process, of taking a smaller number from a larger one, called? Ans. Subtraction.

4. What, then, is Subtraction?

5. James had 3 cents, and gave one away; how many cents then had James? Why?

6. Lucy has 4 books; now, if she gives 2 of them to Jane, how many books will she have left? Why?

7. I had 5 peaches on my table, and gave 1 of them to a little girl; how many peaches had I then on the table? Why?

8. Charles had 6 doves, but the cat killed 2 of them; how many doves then had Charles? Why?

9. Rufus caught 7 fishes, and threw 2 of them back into the water; how many had he left? Why?

10. Lydia had 8 plums, and ate 4 of them; how many had she left? Why?

11. John had 5 nuts, and gave 4 of them to his mother; how many had he left? Why?

12. I had 9 sheets of paper, and gave Charles 4 of them; how many had I left? Why?

13. William had 8 pears, and gave 5 of them to his teacher; how many pears had he left? Why?

14. Ann had 7 chickens, but the rats carried off 4 of them; how many chickens then had Ann? Why?

15. William caught 10 squirrels, but 5 of them ran away; how many were left? Why?

16. Thomas found 12 cents, but lost 2 of them; how many were left? Why?

LESSON XIII.

NOTE TO THE TEACHER. — It is not necessary that the whole of the following table be learned before the pupil proceeds to the subsequent lessons. Only such portions may be committed to memory at a time, as may be considered necessary as he advances in his lessons.

SUBTRACTION TABLE.

1	from	1	leaves	0	2	from	2	leaves	0	3	from	3	leaves	0
1	from	2	leaves	1	2	from	3	leaves	1	3	from	4	leaves	1
1	from	3	leaves	2	2	from	4	leaves	2	3	from	5	leaves	2
1	from	4	leaves	3	2	from	5	leaves	3	3	from	6	leaves	3
1	from	5	leaves	4	2	from	6	leaves	4	3	from	7	leaves	4
1	from	6	leaves	5	2	from	7	leaves	5	3	from	8	leaves	5
1	from	7	leaves	6	2	from	8	leaves	6	3	from	9	leaves	6
1	from	8	leaves	7	2	from	9	leaves	7	3	from	10	leaves	7
1	from	9	leaves	8	2	from	10	leaves	8	3	from	11	leaves	8
1	from	10	leaves	9	2	from	11	leaves	9	3	from	12	leaves	9
1	from	11	leaves	10	2	from	12	leaves	10	3	from	13	leaves	10
1	from	12	leaves	11	2	from	13	leaves	11	3	from	14	leaves	11
1	from	13	leaves	12	2	from	14	leaves	12	3	from	15	leaves	12

4	from	4	leaves	0	4	from	8	leaves	4	4	from	12	leaves	8
4	from	5	leaves	1	4	from	9	leaves	5	4	from	13	leaves	9
4	from	6	leaves	2	4	from	10	leaves	6	4	from	14	leaves	10
4	from	7	leaves	3	4	from	11	leaves	7	4	from	15	leaves	11

5	from	5	leaves	0	6	from	6	leaves	0	7	from	7	leaves	0
5	from	6	leaves	1	6	from	7	leaves	1	7	from	8	leaves	1
5	from	7	leaves	2	6	from	8	leaves	2	7	from	9	leaves	2
5	from	8	leaves	3	6	from	9	leaves	3	7	from	10	leaves	3
5	from	9	leaves	4	6	from	10	leaves	4	7	from	11	leaves	4
5	from	10	leaves	5	6	from	11	leaves	5	7	from	12	leaves	5
5	from	11	leaves	6	6	from	12	leaves	6	7	from	13	leaves	6
5	from	12	leaves	7	6	from	13	leaves	7	7	from	14	leaves	7
5	from	13	leaves	8	6	from	14	leaves	8	7	from	15	leaves	8
5	from	14	leaves	9	6	from	15	leaves	9	7	from	16	leaves	9
5	from	15	leaves	10	6	from	16	leaves	10	7	from	17	leaves	10
5	from	16	leaves	11	6	from	17	leaves	11	7	from	18	leaves	11
5	from	17	leaves	12	6	from	18	leaves	12	7	from	19	leaves	12

8	from	8	leaves	0	9	from	9	leaves	0	10	from	10	leaves	0
8	from	9	leaves	1	9	from	10	leaves	1	10	from	11	leaves	1
8	from	10	leaves	2	9	from	11	leaves	2	10	from	12	leaves	2
8	from	11	leaves	3	9	from	12	leaves	3	10	from	13	leaves	3
8	from	12	leaves	4	9	from	13	leaves	4	10	from	14	leaves	4
8	from	13	leaves	5	9	from	14	leaves	5	10	from	15	leaves	5
8	from	14	leaves	6	9	from	15	leaves	6	10	from	16	leaves	6
8	from	15	leaves	7	9	from	16	leaves	7	10	from	17	leaves	7
8	from	16	leaves	8	9	from	17	leaves	8	10	from	18	leaves	8
8	from	17	leaves	9	9	from	18	leaves	9	10	from	19	leaves	9
8	from	18	leaves	10	9	from	19	leaves	10	10	from	20	leaves	10
8	from	19	leaves	11	9	from	20	leaves	11	10	from	21	leaves	11
8	from	20	leaves	12	9	from	21	leaves	12	10	from	22	leaves	12

11	from	11	leaves	0	11	from	20	leaves	9	12	from	16	leaves	4
11	from	12	leaves	1	11	from	21	leaves	10	12	from	17	leaves	5
11	from	13	leaves	2	11	from	22	leaves	11	12	from	18	leaves	6
11	from	14	leaves	3	11	from	23	leaves	12	12	from	19	leaves	7
11	from	15	leaves	4						12	from	20	leaves	8
11	from	16	leaves	5	12	from	12	leaves	0	12	from	21	leaves	9
11	from	17	leaves	6	12	from	13	leaves	1	12	from	22	leaves	10
11	from	18	leaves	7	12	from	14	leaves	2	12	from	23	leaves	11
11	from	19	leaves	8	12	from	15	leaves	3	12	from	24	leaves	12

LESSON XIV.

1. A BOY has three nuts in his right hand, and two nuts in his left hand; how many more has he in his right hand than in his left? How many has he in both?

2. James gave five cents to Lydia, and three cents to Jane; how many more did he give to Lydia than to Jane? How many did he give both?

3. Gave 6 dollars for a barrel of flour, and 2 dollars for a bushel of quinces; how much more did the flour cost than the quinces? What was the cost of both?

4. Gave 6 cents for a book, and 3 cents for plums; how much more was given for the book than the plums? What was the cost of both?

5. John gave 8 cents for a writing-book, and 2 cents for a ruler; what was the cost of both? How much more was given for the book than the ruler?

6. Samuel had 8 cents, and he gave 6 of them to his brother; how many had he left?

7. Thomas had 10 dollars; he lost 5 dollars; how many had he left?

8. If you had 7 cents in one hand and 4 in the other, how many more would you have in one hand than in the other? How many in both?

9. Paid 8 dollars for a hundred-weight of sugar, and 3 dollars for a cheese; how much more did the sugar cost than the cheese? What was the cost of both?

10. A butcher has 7 sheep and 6 lambs; how many more sheep has he than lambs? How many of both?

11. Gave 9 cents for cherries, and 2 cents for apples; how much more was given for the cherries than for the apples? What was the cost of both?

12. Received 10 dollars for a quantity of wheat; but, *having lost 4 dollars*, how many remain?

13. Gave 7 dollars to the Benevolent Society, and 5

dollars to the Seamen's Aid Society; how much was given to both societies? How much more was given to the former than to the latter?

14. Paid 6 dollars for a pair of boots, and 2 dollars for a pair of shoes; how much more was paid for the boots than the shoes? What was paid for both?

EXERCISES FOR THE SLATE.

From	9	10	12	14	24	26
Take	4	9	11	12	12	14
From	29	34	64	76	64	79
Take	24	12	51	44	12	41
From	44	66	68	49	76	36
Take	22	44	61	34	44	14

LESSON XV.

1. JOHN has 7 cents, and WILLIAM has 4 cents; how many more cents has JOHN than WILLIAM?

2. Paid 5 dollars for a barrel of flour, and 2 dollars for a barrel of apples; how much more was paid for the flour than the apples?

3. SAMUEL has 6 nuts, and THOMAS has 4 nuts; how many more has SAMUEL than THOMAS?

4. Sold a quantity of sugar for 7 dollars, and received in payment a barrel of flour, worth 5 dollars; how many dollars remain due?

5. Gave 10 dollars for a load of hay, and 8 dollars

for a cow; how much more was given for the hay than for the cow? What was the cost of both?

6. Paid 7 dollars for a plank, and 2 dollars for an axe; how much more was paid for the plank than for the axe? What was the cost of both?

7. Gave 7 dollars for a pair of boots, and 2 dollars for a hat; how much more did the boots cost than the hat? How much was given for both?

8. Sold a cloak for 10 dollars, and received in payment some broadcloth, worth 8 dollars; how much remains due?

9. Gave 12 cents for a top, and 3 cents for marbles; how much more was paid for the top than for the marbles? How much was paid for both?

10. Bought a quantity of sugar for 9 dollars, and sold it for 12 dollars; what did I gain?

11. Bought a barrel of flour for 7 dollars, and sold it for 4 dollars; what did I lose?

12. If you had borrowed 12 cents, and had paid 8 cents, how many would you still owe?

13. Borrowed 9 dollars, and paid 3 dollars; how many are still due?

14. Bought a cow for 15 dollars, and paid 10 dollars of it; how many dollars remain unpaid?

15. Bought a plow for 8 dollars, and sold it for 10 dollars; what was gained?

16. James has 13 marbles; if he lose 5 of them, how many will he have left?

17. John found 13 cents, and Samuel found 8 cents; how many more cents did John find than Samuel?

18. John Smith agreed to labor for me fifteen days; but having left me at the end of 8 days, how many days' labor remain due me?

19. Samuel Smith owed me 12 dollars; he gave me a ten-dollar bill; how many dollars remain due?

20. Gave 11 dollars to Emily, and 7 dollars to Betsey; how many more dollars were given to Emily than to Betsey? How many dollars were given to both?

21. Gave Lydia 12 dollars and she lost 8 dollars; how many had she left?

22. Paid 14 cents for a penknife, and 12 cents for an inkstand; how much more did the penknife cost than the inkstand? What was the cost of both?

23. Gave 10 cents for apples, and 12 cents for peaches; what was the cost of both, and how much more was given for the peaches than for the apples?

24. John is 15 years old, and Sally is 9 years old; what is the difference of their ages? What is the sum of their ages?

EXERCISES FOR THE SLATE.

From	14	19	24	21	32	44
Take	12	14	12	11	12	22
From	54	62	64	75	84	92
Take	21	31	42	31	44	61

LESSON XVI.

1. A MAN had 15 barrels of flour; at one time he sold 2 barrels, at another time 4, and at another time 6 barrels; how many barrels did he sell, and how many had he left?

2. Augustus had 14 apples; he gave 4 to one of his companions, 3 to another, and 5 to another; how many did he give away, and how many had he left?

3. Sarah had 15 cherries; she gave 4 to Mary, 6 to Jane, and 1 to Frank; how many did she give away, and how many had she left?

4. Rufus had 16 peaches; having eaten 6, he gave the rest to James; how many did he give away?

5. A merchant had 14 barrels of flour; having sold several barrels, he found he had 12 barrels left; how many had he sold?

6. A boy counted his chickens one night, and found he had 17; he counted them the next morning, and found he had but 14; how many were missing?

7. Lucy's mother gave her some money, to give to four poor children; she gave 6 cents to one, 4 cents to another, 5 cents to another, and 7 cents to another, and had 1 cent left; how many cents did she give away, and how many had she at first?

8. Mary went shopping, with 18 cents in her purse, and when she returned she had only 10 cents remaining; how many cents had she spent?

9. A farmer raised 19 bushels of beans, and 11 bushels of peas; how many more beans did he raise than peas?

10. A lady had 18 dollars in her purse, and lost 5 dollars; how many dollars had she left?

11. Henry had 20 pins, and lost 15 of them; how many had he left?

LESSON XVII.

1. I HAD 14 oranges, and sold 7 of them; how many had I left? 14 less 7 are how many?

2. Thomas had 18 birds, but 9 of them flew away; how many birds remained? 18 less 9 are how many?

3. Henry had 12 quarts of berries, and sold 6 of them; how many had he left? 12 less 6 are how many?

4. Lucy had 16 books, but she gave 9 of them away; how many had she left? 16 less 9 are how many?

5. If I have 20 dollars, and lose 8 of them, how many dollars shall I have left? 20 less 8 are how many?

6. A farmer sold 10 sheep to one man, 6 to another,

and had 12 left; how many had he at first? 22 less 16 are how many?

7. A man had 14 dollars; he paid 4 dollars to one man, and 6 dollars to another man; how many dollars were left? 14 less 10 are how many?

8. Thomas recited 20 perfect lessons, and William only 8; how many more did Thomas recite than William? 20 less 8 are how many?

9. From a vessel containing 25 gallons, 15 gallons leaked out; how many gallons still remained? 25 less 15 are how many?

10. Sold a lot of wood for 25 dollars, and received in payment, some cloth worth 7 dollars; how much was still due? 25 less 7 are how many?

11. Bought a horse for 27 dollars, and sold him for 24 dollars; how much did I lose by the bargain? 27 less 24 are how many?

12. Bought a cow for 28 dollars, and sold her for 30 dollars; how much did I gain by the bargain? 30 less 28 are how many?

13. I had 30 dollars; I paid 10 dollars to one man, 12 to another, and 4 to another; how many dollars did I pay away, and how many had I left?

14. Gave 17 dollars for a cow, and 7 dollars for a sheep; how much more did I give for the cow than for the sheep? How much was given for both?

15. A trader had 30 dollars; he bought flour for 26 dollars, pork for 12 dollars, and butter for 10 dollars; how much money had he left? How much did he pay away?

16. My cistern, which holds 35 gallons, was full in the morning, but at night there were but 30 gallons left; how many gallons had run out?

17. A horse travelled 40 miles one day, and 37 the next day; how many more miles did he travel the first, than the second day?

LESSON XVIII.

QUESTIONS FOR GENERAL EXERCISE.

1.	4	less	2	are	how	many?	4	less	3?
2.	5	less	3	are	how	many?	5	less	4?
3.	6	less	4	are	how	many?	6	less	3?
4.	7	less	3	are	how	many?	7	less	5?
5.	8	less	4	are	how	many?	8	less	2?
6.	8	less	6	are	how	many?	8	less	3?
7.	9	less	4	are	how	many?	9	less	7?
8.	9	less	3	are	how	many?	9	less	6?
9.	10	less	5	are	how	many?	10	less	4?
10.	10	less	6	are	how	many?	10	less	3?
11.	11	less	5	are	how	many?	11	less	4?
12.	11	less	8	are	how	many?	11	less	9?
13.	12	less	6	are	how	many?	12	less	4?
14.	12	less	5	are	how	many?	12	less	8?
15.	13	less	9	are	how	many?	13	less	6?
16.	13	less	10	are	how	many?	13	less	9?
17.	14	less	7	are	how	many?	14	less	9?
18.	14	less	8	are	how	many?	14	less	6?
19.	15	less	7	are	how	many?	15	less	9?
20.	16	less	6	are	how	many?	16	less	7?
21.	17	less	8	are	how	many?	17	less	9?
22.	18	less	5	are	how	many?	18	less	7?
23.	19	less	7	are	how	many?	19	less	4?
24.	20	less	5	are	how	many?	20	less	12?
25.	24	less	12	are	how	many?	24	less	10?
26.	30	less	8	are	how	many?	30	less	15?
27.	40	less	2	are	how	many?	40	less	7?
28.	50	less	7	are	how	many?	50	less	9?
29.	60	less	10	are	how	many?	60	less	30?
30.	70	less	20	are	how	many?	70	less	30?
31.	80	less	25	are	how	many?	80	less	40?
32.	90	less	30	are	how	many?	90	less	40?
33.	100	less	25	are	how	many?	100	less	40?

MULTIPLICATION.

LESSON XIX.

1. WHAT cost 2 apples, at 2 cents apiece?

A. — If 1 apple costs 2 cents, 2 apples will cost 2 times as much; and 2 times 2 cents are 4 cents.

2. What cost 4 peaches, at 3 cents apiece?

B. — If one peach cost 3 cents, 4 peaches will cost 4 times 3 cents, or *four three cents;* and 4 times 3 cents are 12 cents.

3. What do you mean by saying *four times three cents?* ANS. — I mean 3 cents taken *four times* and added together. Thus, 3 and 3 and 3 and 3 are 12; but it is much easier to say, 4 times 3 are 12.

C. — The pupil will perceive, that this is a short way to add numbers. We call this Multiplication.

4. What, then, is Multiplication?

D. — In performing these questions, they should be explained in the same manner as the first question in this lesson.

5. What cost 3 lemons, at 2 cents apiece?
6. James gave 4 cents for one orange; what must he give for 2 oranges?
7. Bought 2 writing-books, at 6 cents apiece; what did they cost?
8. If one pound of raisins cost 7 cents, how much cost 3 pounds?
9. A boy sold 8 apples at 4 cents apiece; how much did they come to?

10. William bought 7 pens, at 2 cents apiece; how much did he pay for them? Why?

11. A farmer sold 8 barrels of apples, at 2 dollars a barrel; what did he receive? Why?

12. Bought 4 yards of cloth, at 4 dollars per yard; how much did it cost? Why?

13. Sold 5 pairs of shoes, at 2 dollars a pair; how much did they come to? Why?

14. If a boat will sail 6 miles in one hour, how far will it sail in 3 hours? Why?

15. Gave 3 cents for one good peach; how many cents would 5 cost? Why?

LESSON XX.

NOTE TO THE TEACHER. — Many teachers are desirous, that the combinations of numbers by multiplication, should be presented to the pupil in a tabular form. We therefore subjoin the following table, which the pupil can use according to the judgment of the teacher.

MULTIPLICATION TABLE.

2	times	0	are 0	3	times	0	are 0	4	times	0	are 0
2	times	1	are 2	3	times	1	are 3	4	times	1	are 4
2	times	2	are 4	3	times	2	are 6	4	times	2	are 8
2	times	3	are 6	3	times	3	are 9	4	times	3	are 12
2	times	4	are 8	3	times	4	are 12	4	times	4	are 16
2	times	5	are 10	3	times	5	are 15	4	times	5	are 20
2	times	6	are 12	3	times	6	are 18	4	times	6	are 24
2	times	7	are 14	3	times	7	are 21	4	times	7	are 28
2	times	8	are 16	3	times	8	are 24	4	times	8	are 32
2	times	9	are 18	3	times	9	are 27	4	times	9	are 36
2	times	10	are 20	3	times	10	are 30	4	times	10	are 40
2	times	11	are 22	3	times	11	are 33	4	times	11	are 44
2	times	12	are 24	3	times	12	are 36	4	times	12	are 48

5 times	0 are	0	6 times	0 are	0	7 times	0 are	0
5 times	1 are	5	6 times	1 are	6	7 times	1 are	7
5 times	2 are	10	6 times	2 are	12	7 times	2 are	14
5 times	3 are	15	6 times	3 are	18	7 times	3 are	21
5 times	4 are	20	6 times	4 are	24	7 times	4 are	28
5 times	5 are	25	6 times	5 are	30	7 times	5 are	35
5 times	6 are	30	6 times	6 are	36	7 times	6 are	42
5 times	7 are	35	6 times	7 are	42	7 times	7 are	49
5 times	8 are	40	6 times	8 are	48	7 times	8 are	56
5 times	9 are	45	6 times	9 are	54	7 times	9 are	63
5 times	10 are	50	6 times	10 are	60	7 times	10 are	70
5 times	11 are	55	6 times	11 are	66	7 times	11 are	77
5 times	12 are	60	6 times	12 are	72	7 times	12 are	84

8 times	0 are	0	9 times	0 are	0	10 times	0 are	0
8 times	1 are	8	9 times	1 are	9	10 times	1 are	10
8 times	2 are	16	9 times	2 are	18	10 times	2 are	20
8 times	3 are	24	9 times	3 are	27	10 times	3 are	30
8 times	4 are	32	9 times	4 are	36	10 times	4 are	40
8 times	5 are	40	9 times	5 are	45	10 times	5 are	50
8 times	6 are	48	9 times	6 are	54	10 times	6 are	60
8 times	7 are	56	9 times	7 are	63	10 times	7 are	70
8 times	8 are	64	9 times	8 are	72	10 times	8 are	80
8 times	9 are	72	9 times	9 are	81	10 times	9 are	90
8 times	10 are	80	9 times	10 are	90	10 times	10 are	100
8 times	11 are	88	9 times	11 are	99	10 times	11 are	110
8 times	12 are	96	9 times	12 are	108	10 times	12 are	120

11 times	0 are	0	11 times	9 are	99	12 times	4 are	48
11 times	1 are	11	11 times	10 are	110	12 times	5 are	60
11 times	2 are	22	11 times	11 are	121	12 times	6 are	72
11 times	3 are	33	11 times	12 are	132	12 times	7 are	84
11 times	4 are	44				12 times	8 are	96
11 times	5 are	55	12 times	0 are	0	12 times	9 are	108
11 times	6 are	66	12 times	1 are	12	12 times	10 are	120
11 times	7 are	77	12 times	2 are	24	12 times	11 are	132
11 times	8 are	88	12 times	3 are	36	12 times	12 are	144

10. William bought 7 pens, at 2 cents apiece; how much did he pay for them? Why?

11. A farmer sold 8 barrels of apples, at 2 dollars a barrel; what did he receive? Why?

12. Bought 4 yards of cloth, at 4 dollars per yard; how much did it cost? Why?

13. Sold 5 pairs of shoes, at 2 dollars a pair; how much did they come to? Why?

14. If a boat will sail 6 miles in one hour, how far will it sail in 3 hours? Why?

15. Gave 3 cents for one good peach; how many cents would 5 cost? Why?

LESSON XX.

NOTE TO THE TEACHER. — Many teachers are desirous that the combinations of numbers by multiplication, should be presented to the pupil in a tabular form. We therefore subjoin the following table, which the pupil can use according to the judgment of the teacher.

MULTIPLICATION TABLE.

2	times	0	are	0	3	times	0	are	0	4	times	0	are	0
2	times	1	are	2	3	times	1	are	3	4	times	1	are	4
2	times	2	are	4	3	times	2	are	6	4	times	2	are	8
2	times	3	are	6	3	times	3	are	9	4	times	3	are	12
2	times	4	are	8	3	times	4	are	12	4	times	4	are	16
2	times	5	are	10	3	times	5	are	15	4	times	5	are	20
2	times	6	are	12	3	times	6	are	18	4	times	6	are	24
2	times	7	are	14	3	times	7	are	21	4	times	7	are	28
2	times	8	are	16	3	times	8	are	24	4	times	8	are	32
2	times	9	are	18	3	times	9	are	27	4	times	9	are	36
2	times	10	are	20	3	times	10	are	30	4	times	10	are	40
2	times	11	are	22	3	times	11	are	33	4	times	11	are	44
2	times	12	are	24	3	times	12	are	36	4	times	12	are	48

19. Bought 7 gallons of oil, at 2 dollars a gallon; what was the cost?

20. What cost 7 barrels of vinegar, at 3 dollars a barrel? If one barrel cost 3 dollars, 7 barrels will cost 7 times as much; and 7 times 3 dollars are 21 dollars.

21. What cost 6 bushels of grapes, at 4 dollars a bushel?

22. When 5 dollars are paid for one square rod of land, what must be given for 5 square rods?

23. What cost 2 pounds of sugar, at 8 cents a pound?

24. What cost 4 pounds of raisins, at 6 cents a pound?

25. If 5 cents are paid for a loaf of bread, what must be paid for 6 loaves?

26. When 5 bushels of apples are paid for a barrel of flour, how many bushels must be paid for 7 barrels of flour?

27. When 8 cents are paid for a sheet of gingerbread, how much must be given for 4 sheets?

28. If one dollar is paid for 2 gallons of oil, how much must be paid for 8 gallons?

29. When 9 dollars will buy a load of hay, what will 3 loads cost?

30. What is the value of 8 bushels of cranberries, at 5 dollars a bushel?

31. What cost 5 yards of cloth, at 5 dollars a yard?

32. What cost 3 barrels of molasses, at 10 dollars a barrel? What cost 4 barrels? 8 barrels?

33. When 9 dollars will buy a vest, how much must be given for 4 vests?

34. At 7 dollars a barrel, what cost 4 barrels of fish?

35. What cost 5 quarts of chestnuts, at 8 cents a quart?

36. If a horse travel 10 miles in 1 hour, how many miles will he travel in 10 hours?

LESSON XXII.

1. WHAT cost 2 bushels of apples, at 2 dollars a bushel? If one bushel cost 2 dollars, 2 bushels will cost 2 times as much; and 2 times 2 dollars are 4 dollars.

2. What cost 3 pecks of quinces, at 2 shillings a peck? At 3 shillings? At 4 shillings? At 5 shillings?

3. John gave 2 cents apiece for 3 apples; how much did they cost?

4. Bought 5 lemons, for 2 cents apiece; what was the cost?

5. What cost 4 yards of riband, at 2 cents a yard?

6. What cost 5 barrels of apples, at 2 dollars a barrel? What cost 6 barrels? What cost 7 barrels?

7. What must be given for 3 rolls of candy, at 3 cents a roll? At 4 cents? At 6 cents? At 8 cents?

8. What must be given for 4 bushels of rye, at 2 dollars a bushel? 6 bushels? 8 bushels? 12 bushels?

9. What cost 3 bushels of wheat, at 2 dollars a bushel? 4 bushels? 6 bushels? 7 bushels? 9 bushels?

10. What cost 3 pounds of coffee, at 7 cents a pound? What cost 5 pounds? 7 pounds? 8 pounds? 9 pounds? 10 pounds? 11 pounds? 12 pounds?

11. What cost 3 yards of riband, at 6 cents a yard? What cost 5 yards? 6 yards? 7 yards? 8 yards?

12. If one pound of beef cost 7 cents, what cost 3 pounds? 4 pounds? 5 pounds? 6 pounds? 7 pounds?

13. If one bushel of apples cost 3 shillings, what cost 3 bushels? 8 bushels? 10 bushels? 12 bushels?

14. If one pound of raisins cost 4 cents, what cost 3 pounds? 4 pounds? 5 pounds? 12 pounds? 9 pounds? 8 pounds? 7 pounds? 6 pounds? 10 pounds?

15. When 5 dollars are paid for one barrel of flour, *what will be the* cost of 3 barrels? Of 4 barrels? 5 *barrels? 6* barrels? 7 barrels? 8 barrels? 9 barrels? *10 barrels?* 11 barrels? 12 barrels?

16. Gave 6 dollars for a ton of hay; what is the value of 2 tons? 3 tons? 4 tons? 5 tons? 6 tons? 7 tons? 8 tons? 9 tons? 10 tons? 11 tons?

17. Paid 7 cents for one quart of milk; what cost 2 quarts? 3 quarts? 4 quarts? 5 quarts? 6 quarts? 7 quarts? 8 quarts? 9 quarts? 10 quarts?

18. When good sugar is sold for 8 cents a pound, what must be paid for 2 pounds? 3 pounds? 4 pounds? 5 pounds? 6 pounds? 7 pounds? 8 pounds? 9 pounds? 10 pounds? 11 pounds?

19. F. Johnson sells good coffee at 9 cents a pound; what must I pay him for 2 pounds? 3 pounds? 4 pounds? 5 pounds? 6 pounds? 7 pounds? 8 pounds? 9 pounds? 10 pounds? 12 pounds?

20. A good horse will travel 10 miles in one hour; how far will he travel in 3 hours? In 4 hours? 5 hours? 6 hours? 7 hours? 8 hours? 9 hours? 10 hours? 11 hours? 12 hours?

21. If 4 farthings make one penny, how many farthings are there in 4 pence? 5 pence? 6 pence? 7 pence? 9 pence? 10 pence? 11 pence? 12 pence?

22. In one shilling there are 12 pence; how many pence in 2 shillings? 3 shillings? 4 shillings? 5 shillings? 6 shillings? 7 shillings? 8 shillings?

23. In one week there are 7 days; how many days in 2 weeks? 3 weeks? 4 weeks? 5 weeks? 6 weeks? 7 weeks? 8 weeks? 9 weeks? 10 weeks? 11 weeks? 12 weeks?

24. If a man can walk 4 miles in one hour, how far will he walk in 4 hours? In 5 hours? 6 hours? 7 hours? 8 hours? 9 hours? 10 hours? 11 hours?

25. If James recite 6 perfect lessons in one day, how many will he recite in 6 days? In 7 days? 8 days? 9 days? 10 days?

26. William sold 4 doves, at 12 cents apiece; how *much did he* receive for them? How much for 6? 7? *8? 9? 10?* 11? 12?

LESSON XXIII.

1. Bought 9 pounds of raisins, at 9 cents a pound; how much did they cost?

2. 9 times 9 are how many? 9 times 10? 9 times 11?

3. Sold sugar at the rate of one pound for 8 cents; how much did I receive for 12 pounds?

4. 8 times 12 are how many? 8 times 11? 8 times 10?

5. If a barrel of molasses cost 7 dollars, what cost 9 barrels?

6. 9 times 7 are how many? 9 times 9? 9 times 12?

7. James bought 10 oranges, at 4 cents apiece; what was the cost?

8. 10 times 4 are how many? 10 times 7? 10 times 12?

9. If a man can earn 12 dollars in one week, how much can he earn in 6 weeks?

10. 12 times 6 are how many? 12 times 7? 12 times 8?

11. If a horse can travel 11 miles in one hour, how far can he travel in 6 hours?

12. 6 times 11 are how many? 7 times 11? 9 times 11?

13. If 6 men can do a piece of work in 7 days, how long will it take one man to do the same work?

14. 6 times 7 are how many? 6 times 8? 6 times 9?

15. If a quantity of provision will supply 9 men 8 days, how long will it supply one man?

16. What cost 6 pounds of butter, at 12 cents a pound? 8 pounds? 9 pounds? 10 pounds?

17. *How far can* you travel in 8 hours, if you travel *4 miles an hour?* How far in 9 hours?

18. Bought 10 yards of broadcloth, at 7 dollars per yard; what did it cost?

19. Sold 12 cords of wood, at 6 dollars a cord; how much did I receive?

20. John sold 9 quarts of berries, at 4 cents per quart; how much did he receive for them?

21. What cost 7 pounds of soda, at 12 cents a pound? 8 pounds? 9 pounds? 12 pounds?

22. Gave 4 cents apiece for 12 pens; how much did they cost? What cost 9 pens? 8 pens? 7 pens? 6 pens? 5 pens? 4 pens? 3 pens?

LESSON XXIV.

QUESTIONS FOR GENERAL EXERCISE.

1. Four times four are how many?
2. Three times seven are how many?
3. Two times six are how many?
4. Six times four are how many?
5. Five times seven are how many?
6. Eight times three are how many?
7. Five times eight are how many?
8. Four times nine are how many?
9. Nine times three are how many?
10. Seven times six are how many?
11. Six times eight are how many?
12. Three times nine are how many?
13. Five times ten are how many?
14. Eight times nine are how many?
15. Four times four are how many?
16. Seven times five are how many?
17. Nine times seven are how many?
18. Six times six are how many?
19. Two times twelve are how many?

20. Three times eleven are how many?
21. Four times ten are how many?
22. Ten times five are how many?
23. Six times ten are how many?
24. Four times twelve are how many?
25. Seven times twelve are how many?
26. Twelve times five are how many?
27. Twelve times three are how many?
28. Five times eleven are how many?
29. Eleven times six are how many?
30. Nine times nine are how many?
31. Eleven times eleven are how many?
32. Ten times ten are how many?
33. Twelve times seven are how many?
34. Twelve times ten are how many?
35. Seven times twelve are how many?
36. Seven times eleven are how many?
37. Six times twelve are how many?
38. Seven times seven are how many?
39. Twelve times twelve are how many?
40. How many are 4 times 5? 5 times 6? 6 times 7? 7 times 8? 8 times 9? 9 times 10?
41. How many are 5 times 3? 3 times 7? 4 times 7? 6 times 9? 4 times 12? 11 times 8? 9 times 11? 11 times 7? 6 times 11?
42. How many are 12 times 2? 3 times 12? 12 times 6? 7 times 12? 12 times 9?

EXERCISES FOR THE SLATE.

Multiply	124	122	421
By	2	3	4
Multiply	322	412	349
By	4	3	2

DIVISION.

LESSON XXV.

1. JAMES has 12 peaches, which he wishes to give to 4 of his companions; how many can he give to each?

A. — James, in distributing his peaches, finds that he can take 4 peaches from the 12 peaches 3 times; therefore, he can give them 3 apiece. But, as he wishes to shorten the process, and tell at once how many he can give them, he inquires how many times 4 is contained in 12; and 4 is contained in 12, 3 times; therefore, he can give each one 3 peaches. This short method of subtracting is called Division.

2. I have 4 cents to give to 2 little girls; how many can I give to each? Why?

3. William divided 6 nuts among 3 of his cousins; how many did each receive? Why?

4. Thomas has 8 apples, which he wishes to give to 2 boys; how many can he give to each?

5. Lucy divides 9 apples among her 3 sisters; how many does each receive? Why?

6. Mary has 10 pins in 2 cushions; how many are there in each cushion? Why?

7. If you wish to give 8 pears to 2 of your playfellows, how many could you give to each?

8. Divide 12 dollars equally among 6 men; how many will each receive? Why?

9. Harry had 6 chestnuts to give to 2 of his brothers; how many did each receive?

10. Thomas distributed 10 cents equally among 5 of his playmates; how many did each receive?

11. If you wish to give 8 plums to 4 persons, how many can you give to each? Why?

12. I have 14 oranges, and wish to give them equally to 7 little girls; how many will each receive? Why?

13. Divided 10 peaches equally among 2 boys; how many did each receive? Why?

LESSON XXVI.

To THE TEACHER. — The same remarks will apply, in introducing the following table, that were made in reference to the preceding tables.

DIVISION TABLE.

2	in	2,	1	time	3	in	3,	1	time	4	in	4	1	time
2	in	4,	2	times	3	in	6,	2	times	4	in	8,	2	times
2	in	6,	3	times	3	in	9,	3	times	4	in	12,	3	times
2	in	8,	4	times	3	in	12,	4	times	4	in	16,	4	times
2	in	10,	5	times	3	in	15,	5	times	4	in	20,	5	times
2	in	12,	6	times	3	in	18,	6	times	4	in	24,	6	times
2	in	14,	7	times	3	in	21,	7	times	4	in	28,	7	times
2	in	16,	8	times	3	in	24,	8	times	4	in	32,	8	times
2	in	18,	9	times	3	in	27,	9	times	4	in	36,	9	times
2	in	20,	10	times	3	in	30,	10	times	4	in	40,	10	times
2	in	22,	11	times	3	in	33,	11	times	4	in	44,	11	times
2	in	24,	12	times	3	in	36,	12	times	4	in	48,	12	times

5	in	5,	1	time	6	in	6,	1	time	7	in	7,	1	time
5	in	10,	2	times	6	in	12,	2	times	7	in	14,	2	times
5	in	15,	3	times	6	in	18,	3	times	7	in	21,	3	times
5	in	20,	4	times	6	in	24,	4	times	7	in	28,	4	times
5	in	25,	5	times	6	in	30,	5	times	7	in	35,	5	times
5	in	30,	6	times	6	in	36,	6	times	7	in	42,	6	times
5	in	35,	7	times	6	in	42,	7	times	7	in	49,	7	times
5	in	40,	8	times	6	in	48,	8	times	7	in	56,	8	times
5	in	45,	9	times	6	in	54,	9	times	7	in	63,	9	times
5	in	50,	10	times	6	in	60,	10	times	7	in	70,	10	times
5	in	55,	11	times	6	in	66,	11	times	7	in	77,	11	times
5	in	60,	12	times	6	in	72,	12	times	7	in	84,	12	times

8 in 8, 1 time	9 in 9, 1 time	10 in 10, 1 time
8 in 16, 2 times	9 in 18, 2 times	10 in 20, 2 times
8 in 24, 3 times	9 in 27, 3 times	10 in 30, 3 times
8 in 32, 4 times	9 in 36, 4 times	10 in 40, 4 times
8 in 40, 5 times	9 in 45, 5 times	10 in 50, 5 times
8 in 48, 6 times	9 in 54, 6 times	10 in 60, 6 times
8 in 56, 7 times	9 in 63, 7 times	10 in 70, 7 times
8 in 64, 8 times	9 in 72, 8 times	10 in 80, 8 times
8 in 72, 9 times	9 in 81, 9 times	10 in 90, 9 times
8 in 80, 10 times	9 in 90, 10 times	10 in 100, 10 times
8 in 88, 11 times	9 in 99, 11 times	10 in 110, 11 times
8 in 96, 12 times	9 in 108, 12 times	10 in 120, 12 times

11 in 11, 1 time	11 in 99, 9 times	12 in 48, 4 times
11 in 22, 2 times	11 in 110, 10 times	12 in 60, 5 times
11 in 33, 3 times	11 in 121, 11 times	12 in 72, 6 times
11 in 44, 4 times	11 in 132, 12 times	12 in 84, 7 times
11 in 55, 5 times		12 in 96, 8 times
11 in 66, 6 times	12 in 12, 1 time	12 in 108, 9 times
11 in 77, 7 times	12 in 24, 2 times	12 in 120, 10 times
11 in 88, 8 times	12 in 36, 3 times	12 in 132, 11 times

LESSON XXVII.

1. If 4 bushels of apples cost 8 shillings, what costs 1 bushel? Why?

A. — If 8 shillings will buy 4 bushels, one bushel can be bought for as many shillings as 4 is contained in 8; and 4 is contained in 8, 2 times; therefore, one bushel will cost 2 shillings.

2. If 3 pounds of butter cost 36 cents, what is the price of one pound? What must be given for 5 pounds?

B. — If 3 pounds cost 36 cents, one pound can be bought for as many cents as 3 is contained in 36; and 3

is contained in 36, 12 times; if one pound cost 12 cents, 5 pounds will cost 5 times 12 cents, and 5 times 12 cents are 60 cents; therefore, 5 pounds will cost 60 cents.

3. If 2 barrels of apples cost 4 dollars, how much will one barrel cost? What cost 3 barrels? 4 barrels? 5 barrels? 6 barrels? 8 barrels?

4. When 6 dollars will purchase 3 yards of Alepine cloth, how much will one yard cost? 2 yards? 4 yards? 5 yards? 7 yards? 9 yards?

5. A boy gave 8 cents for 4 pears; how much did one pear cost? 2 pears? 3 pears? 5 pears?

6. Lucy bought 3 skeins of thread for 9 cents; how much was that a skein? What cost 2 skeins? 4 skeins? 6 skeins? 8 skeins? 9 skeins? 10 skeins?

7. Adeline gave 10 cents for 5 rolls of candy; what cost one roll? 2 rolls? 4 rolls? 6 rolls?

8. If 12 dollars be given for 6 barrels of vinegar, what must be given for one barrel? For 2 barrels? For 4 barrels? For 5 barrels? For 7 barrels? For 8 barrels? For 9 barrels?

9. When chalk can be bought at the rate of 7 pounds for 14 cents, what costs one pound? 2 pounds? 3 pounds? 5 pounds? 9 pounds?

10. If 15 dollars will buy 5 barrels of soap, how many dollars must be given for one barrel? For 3 barrels? For 6 barrels? For 7 barrels?

11. Sarah gave 16 cents for 2 papers of pins; what cost one paper? 3 papers? 4 papers? 6 papers? 7 papers? 8 papers? 9 papers? 12 papers?

12. If 8 bushels of wheat cost 16 dollars, how much will one bushel cost? 3 bushels? 5 bushels?

13. Bought 2 pounds of butter for 24 cents; how much was that a pound? What cost 4 pounds?

14. Sold 5 yards of broadcloth for 15 dollars; what *was the price of* one yard? Of 2 yards? Of 3 yards? *Of 6 yards?* Of 8 yards? Of 9 yards? Of 12 yards?

15. Margaret gave 16 cents for 8 needles; how

much did she give apiece? What was the cost of 2 needles? Of 3 needles? Of 5 needles? Of 7 needles?

16. What cost one yard of cloth, if 6 yards can be bought for 18 dollars? What cost 2 yards? 3 yards? 4 yards? 7 yards? 9 yards? 10 yards?

17. William gave 20 cents for 5 peaches; what was the cost of one peach? Of 3 peaches? Of 4 peaches? Of 6 peaches? Of 9 peaches? Of 12 peaches?

18. When 7 cords of pine wood cost 21 dollars, what is the cost of one cord? Of 2 cords? Of 3 cords? Of 4 cords? Of 5 cords? Of 6 cords?

19. If 24 dollars will purchase 8 acres of wild land, how much will 1 acre cost? 2 acres? 3 acres? 4 acres? 6 acres? 9 acres? 10 acres? 12 acres?

20. A lady purchased 9 yards of Alpacca cloth for 18 dollars; how much was that a yard? What cost 2 yards? 3 yards? 4 yards? 5 yards? 6 yards?

21. Henry had 18 nuts, which he wished to divide equally among 6 of his companions; how many could he give to each?

22. Albert had 26 pine-apples, and wished to give 2 apiece to his classmates; to how many could he give them?

23. A farmer sold 3 tons of hay for 24 dollars; how much was it a ton? What cost 2 tons? 4 tons? 5 tons? 6 tons? 7 tons? 8 tons? 9 tons?

24. A lad sold 7 quarts of fruit for 28 cents; what cost one quart? 2 quarts? 3 quarts?

LESSON XXVIII.

1. If 9 melons cost 27 cents, what costs one melon? What cost 2 melons? 4 melons? 7 melons? 10 melons?

2. *Paid* 30 cents for 5 little books; what cost one *book?* 3 books? 4 books? 9 books?

3. A farmer sold 7 cords of wood for 35 dollars; what cost one cord? 4 cords? 6 cords? 9 cords?

4. William bought 5 pens for 25 cents; how much did he pay apiece? What cost 7?

5. Mary gave 24 cents for 6 papers of pins; what cost one paper? 4 papers? 7 papers?

6. If 4 oranges cost 12 cents, how much will one orange cost? 2 oranges? 3 oranges? 5 oranges? 6 oranges? 7 oranges? 8 oranges? 9 oranges?

7. If 16 cents are paid for 8 nutmegs, how much are they apiece? What would 2 nutmegs cost? 3 nutmegs? 4 nutmegs? 6 nutmegs? 7 nutmegs? 9 nutmegs? 12 nutmegs?

8. A man bought 3 pounds of coffee for 24 cents; how much was it a pound? What cost 2 pounds? 4 pounds? 5 pounds? 6 pounds? 7 pounds? 9 pounds?

9. Bought 10 pairs of shoes for 30 dollars; what cost one pair? 2 pairs? 3 pairs? 4 pairs? 5 pairs? 7 pairs? 8 pairs? 9 pairs? 12 pairs?

10. Sold 7 barrels of flour for 28 dollars; what cost one barrel? What cost 5 barrels? 6 barrels? 8 barrels? 10 barrels? 12 barrels?

11. If 4 yards of cambric cost 32 cents, what is the cost of one yard? Of 2 yards? Of 3 yards? Of 5 yards? Of 7 yards? Of 8 yards? Of 12 yards?

12. When wheat is sold at the rate of 9 bushels for 27 dollars, how much is that a bushel? What cost 2 bushels? 3 bushels? 4 bushels? 5 bushels? 6 bushels? 7 bushels? 8 bushels? 10 bushels?

13. If 48 cents are paid for 6 dozen of eggs, how many cents will one dozen cost? If one dozen cost 8 cents, what will 4 dozen cost? 5 dozen? 9 dozen? 7 dozen? 8 dozen? 10 dozen? 12 dozen?

14. If 5 tons of hay cost 50 dollars, how much is that a ton? If one ton cost 10 dollars, what cost 8 tons? 9 tons? 10 tons? 11 tons? 12 tons?

15. Paid 63 cents for 7 pounds of cheese; what w...

the cost of one pound? Of 2 pounds? Of 4 pounds? Of 6 pounds? Of 9 pounds? Of 10 pounds? Of 11 pounds? Of 12 pounds?

16. James gave 27 cents for 9 steel pens; what was the price of one? If one pen cost 3 cents, what cost 10 pens? 11 pens? 12 pens? 13 pens?

17. Mary purchased 9 yards of muslin for 81 cents; how much was that a yard? What cost 8 yards? 10 yards? 12 yards? 7 yards? 5 yards?

18. A farmer sold at market 8 cords of wood, for which he received 64 dollars; how much did he receive per cord? How much for 4 cords? 5 cords? 7 cords?

19. A merchant bought 7 boxes of sugar for 63 dollars; how much was that a box? What cost 4 boxes? 6 boxes? 9 boxes? 10 boxes? 12 boxes?

20. A lady purchased 9 yards of riband for 81 cents; what cost one yard? 2 yards? 5 yards? 7 yards? 8 yards? 10 yards? 11 yards? 12 yards?

21. A gentleman purchased 12 yards of broadcloth for 60 dollars; what was the cost of one yard? 2 yards? 4 yards? 6 yards? 7 yards? 9 yards? 10 yards? 11 yards? 13 yards? 15 yards? 20 yards?

22. When vinegar is 9 cents a quart, how many quarts can be bought for 27 cents? For 36 cents? For 45 cents? For 54 cents? For 108 cents?

23. A man, dying, left an estate valued at 144 dollars, to be divided equally among his 12 children; how many dollars did each receive?

24. A lady divided 54 cents equally among her 3 sons and 3 daughters; how many did each receive?

25. When 72 dollars are paid for 8 acres of land, what is the cost of 1 acre? Of 3 acres? Of 4 acres? Of 6 acres? Of 7 acres? Of 9 acres?

26. If you pay 84 cents for 7 pounds of chocolate, how much is that a pound? How much would 2 pounds cost? 4 pounds? 5 pounds? 8 pounds? 9 pounds? 10 pounds? 11 pounds? 12 pounds?

LESSON XXIX.

QUESTIONS FOR GENERAL EXERCISE.

1. EIGHT are how many times 4? How many times 2?

2. Twelve are how many times 3? How many times 6? How many times 4? How many times 2?

3. Sixteen are how many times 4? How many times 8? How many times 2?

4. Eighteen are how many times 6? How many times 3? How many times 2? How many times 9?

5. Twenty are how many times 4? How many times 5? How many times 10? How many times 2?

6. Twenty-one are how many times 7? How many times 3?

7. Twenty-four are how many times 6? How many times 4? How many times 3? How many times 8? How many times 12? How many times 2?

8. Twenty-five are how many times 5?

9. Twenty-seven are how many times 3? How many times 9?

10. Twenty-eight are how many times 7? How many times 4? How many times 2?

11. Thirty are how many times 3? How many times 10? How many times 5? How many times 6?

12. Thirty-five are how many times 7? How many times 5?

13. Thirty-six are how many times 6? How many times 12? How many times 3? How many times 4? How many times 9?

14. Forty are how many times 4? How many times 10? How many times 8? How many times 5?

15. Forty-two are how many times 7? How many times 6?

16. *Forty-four* are how many times 11? How many times 4?

17. Forty-eight are how many times 6? How many times 12? How many times 4? How many times 8?

18. Fifty are how many times 10? How many times 5?

19. Fifty-four are how many times 9? How many times 6?

20. Fifty-five are how many times 11? How many times 5?

21. Fifty-six are how many times 7? How many times 8?

22. Sixty are how many times 10? How many times 6? How many times 5? How many times 12?

23. Sixty-three are how many times 7? How many times 9?

24. Sixty-four are how many times 8?

25. Sixty-six are how many times 11? How many times 6?

26. Seventy are how many times 10? How many times 7?

27. Seventy-two are how many times 9? How many times 8? How many times 12?

28. Eighty are how many times 10? How many times 8?

29. Eighty-one are how many times 9?

30. Eighty-four are how many times 7? How many times 12?

31. Eighty-eight are how many times 11? How many times 8?

32. Ninety are how many times 9? How many times 10?

33. Ninety-six are how many times 8? How many times 12?

34. Ninety-nine are how many times 9? How many times 11?

35. One hundred are how many times 10? How *many times 5?* How many times 20? How many *times 25?*

36. One hundred eight are how many times How many times 9?

37. One hundred ten are how many times 11? many times 10?

38. One hundred twenty are how many time: How many times 10?

39. One hundred thirty-two are how many time How many times 12?

40. One hundred forty-four are how many time

41. How many pounds of raisins, at 8 cents a p can you buy for 24 cents? For 32 cents? F cents? For 48 cents? For 56 cents? For 72 c For 96 cents?

42. How many acres of land, at 9 dollars an acr be bought for 36 dollars? For 45 dollars? F dollars? For 72 dollars? For 108 dollars?

43. A man purchased 8 pounds of chocolate f cents; how much was that a pound? What was th of 7 pounds? Of 9 pounds? Of 12 pounds?

44. How much rye, at 5 shillings a bushel, c obtained for 25 shillings? How much for 45 shill For 50 shillings?

45. How many oranges, at 6 cents apiece, can yo for 48 cents? How many for 54 cents?

46. When hay is 12 dollars a ton, how many ton be bought for 60 dollars? For 72 dollars?

47. Bought 9 pounds of sugar for 90 cents; much cost one pound?

48. Sold 12 tons of hay for 108 dollars; wha the price of a ton?

49. Bought 12 tons of coal for 144 dollars; wha 1 ton? 4 tons? 5 tons? 7 tons? 9 tons?

50. How many cords of wood, at 5 dollars per can be bought for 100 dollars?

51. A gentleman divided 120 dollars equally a *10 orphans; how* many dollars did each receive?

LESSON XXX.

QUESTIONS INVOLVING MULTIPLICATION AND DIVISION.

1. BOUGHT 4 oranges at 2 cents apiece, and paid for them with lemons at 4 cents apiece; how many lemons did it take to pay for the oranges?

2. Sold 2 barrels of flour at 5 dollars a barrel, and took my pay in butter at 2 dollars a firkin; how many firkins did I receive?

3. James bought 4 sheets of paper at 3 cents a sheet, and paid for them with melons at 6 cents apiece; how many melons did it take?

4. Rufus bought 6 marbles at 2 cents apiece, and paid for them in oranges at 3 cents apiece; how many oranges did it take?

5. A farmer sold 3 sheep at 2 dollars apiece, and received payment in cloth at 4 dollars a yard; how many yards did he receive?

6. Bought 3 pounds of coffee at 8 cents a pound, and paid for it with oranges at 4 cents apiece; how many oranges did it take?

7. Sold 4 pounds of sugar at 9 cents a pound; how many pounds of butter should I receive in payment, at 12 cents a pound?

8. Bought 9 barrels of flour at 4 dollars a barrel, and paid for it with grain at 2 dollars a bushel; how many bushels did it take?

9. Samuel bought 5 lemons at 4 cents apiece, and 4 apples at 2 cents apiece; he paid for them with nuts at 7 cents a quart; how many quarts did it require?

10. Bought 4 dozen of eggs at 12 cents a dozen, and paid for them with sugar at 8 cents a pound; how many pounds did it take?

11. Sold 6 quarts of milk at 6 cents a quart, and took my pay in sugar at 12 cents a pound; how many pounds did I receive?

12. Bought 9 cords of wood at 6 dollars a cord, and paid for it with cloth at 6 dollars a yard; how many yards did it take?

13. Bought 5 yards of cotton cloth at 8 cents a yard, 2 yards of tape at 4 cents a yard, and some pins for 2 cents, and paid with eggs at 10 cents a dozen; how many dozen did it take? 10 in 50, how many times?

14. Charles owed James 48 cents; at one time he paid 10 cents, at another 8 cents, and at another time 10 oranges at 3 cents apiece; how much then remained due?

15. A farmer sold a load of hay for 15 dollars, some apples for 5 dollars, and peaches for 6 dollars; at one time he received in payment 2 barrels of flour at 5 dollars a barrel; at another time, 4 yards of broadcloth at 3 dollars a yard; how much still remained due?

16. James bought of Alonzo 8 quarts of cranberries, at 12 cents a quart; to pay for them, he gave raisins worth 12 cents a pound; how many pounds did it take?

17. In a school-house there are 54 seats, and 9 seats in each row; how many rows are there?

18. William had 24 peaches; he gave 4 of them to one of his companions, 3 to another, and 5 to another, and divided the remainder equally among his 3 sisters; how many did each receive?

19. A farmer had 30 hens; the cat killed 5 of them, and 10 were carried off by a fox; he sold the remainder at 2 shillings apiece, and divided the money equally among 6 poor persons; how many shillings did he receive, and how many did he give to each poor person?

20. Thomas received 4 cents for his nuts, 5 cents for his plums, and 3 cents for some peaches; and with the money he bought some wafers at 4 cents a box; how *many boxes* did he buy?

21. A cistern contained 60 gallons, and by a pipe *10 gallons would* run into it in one hour, and by another

pipe, 5 gallons would run out of it in an hour; how many gallons would remain in the cistern at the end of one hour, and in how many hours would the cistern be filled?

22. Two boys ran a race of 40 rods; the first ran it in 5 minutes, and the second ran it in 4 minutes; now many rods did each run in a minute?

LESSON XXXI.

QUESTIONS INVOLVING ALL OF THE PRECEDING PRINCIPLES.

1. A BOY had 12 cherries; another boy gave him 7, another 6, another 4, another 10, and another gave him enough to make the number 50; how many did the last give him?

2. James gave 4 nuts to John, 7 to William, 5 to Henry, and had 7 left; how many had he at first?

3. If 9 men can do a piece of work in 8 days, how long will it take one man to do the same work?

4. William had 30 chickens; he counted them at noon, and found but 24, and counted them again at night, and found but 19; how many were missing at noon, and how many were missing at night?

5. Farmer Jones owed 40 dollars; at one time he paid 14 dollars, at another time 6, at another time 10, and at another time he paid all but 6 dollars; how many dollars did he pay the last time?

6. Bought a stove for 10 dollars, a sofa for 12 dollars, and a chair for 4 dollars. I paid for the sofa; how much did I then owe?

7. Two men were to do a piece of work in 7 days; one was to receive 3 dollars a day, and the other 2 dollars *a day; how* much did both receive? How much *more did one* receive than the other?

8. *There* are 6 working days in a week; how m

will a man earn in 4 weeks, if he receives 2 dollars a day?

9. A can travel at the rate of 5 miles an hour; having travelled 30 miles, B set out at the rate of 7 miles an hour; how long did it take B to overtake A?

10. Sold a cow for 30 dollars, and a horse for 40 dollars; I gained 10 dollars on the cow, and lost 4 dollars on the horse; did I gain or lose by the bargain, and how much?

11. Bought a table, and handed the man a 50 dollar note, and received 17 dollars back; how much did I pay for the table?

LESSON XXXII.

1. Bought 4 pounds of starch at 6 cents a pound, and 3 pounds of beef at 4 cents a pound; what was the whole cost?

2. A man bought 5 barrels of flour at 7 dollars a barrel, and paid for it in fish at five dollars a quintal; how many quintals did it take?

3. James had 25 apples; he gave 4 to Henry, 5 to William, 3 to Samuel, and 7 to Caroline; how many did he give away? How many had he left?

4. A farmer raised 25 bushels of potatoes; he sold 10 bushels to one man, 6 bushels to another, and 4 bushels to another; how many bushels remained?

5. If you have 48 pounds of sugar, which you wish to put into boxes containing 4 pounds each, how many *boxes will it* take?

6. *9 men* bought a piece of land for 54 dollars; how *much did* each man pay?

7. *Thomas* gave 6 apples to Lydia, 7 to Susan, 4 to

Moses, 3 to Angelina, and had 5 left; how many had he at first? How many more did he give to Susan than to Moses?

8. A certain school-house has 5 rows of seats, and 9 seats in each row; how many seats are there in the school-house?

9. If a certain sum of money will last 7 men 9 days, how long would it last 1 man?

10. A young lady purchased 5 yards of silk at 2 dollars a yard, 4 yards of crape at 3 dollars a yard, some riband for 2 dollars, and a pair of gloves for 1 dollar; she paid 3 ten-dollar bills; how many dollars did she receive back again?

11. Six men can build a wall in 9 days; how many men must be employed to build it in one day?

12. A's house is 12 rods in a straight line from B's, and B's 10 rods from C's, and C's 8 rods from the meeting-house; how far is A's house from the meeting-house?

13. A man bought 12 bushels of wheat at 2 dollars a bushel, and 4 yards of cloth at 3 dollars a yard; he paid for them in wood at 6 dollars a cord; how many cords did it take?

14. A grocer sold 12 pounds of coffee at 8 cents a pound; for pay, he received eggs at 12 cents a dozen; how many dozen did he receive?

15. How much cloth, at 4 dollars a yard, will it take to buy 9 cords of wood at 4 dollars a cord?

16. How many pears, at 3 dollars a bushel, will it take to pay for 12 bushels of quinces at 3 dollars a bushel?

17. James divided 54 cherries equally among 6 of his companions; how many did he give to each?

18. In one week there are 7 days; how many weeks in 21 days? In 14 days? In 28 days? In 42 days? In 35 days? In 56 days? In 63 days?

19. If 9 dollars be paid for a suit of clothes, how many *suits can be* bought for 63 dollars?

20. When flour is 8 dollars a barrel, how many bar-

rels can be obtained for 56 dollars? For 64? For 72? For 80? For 104?

21. Bought 6 pounds of coffee at 12 cents a pound, and paid for it with lard at 12 cents a pound; how many pounds did it take?

22. A man divided 120 dollars equally among 10 poor persons; how many dollars did each receive?

23. How much rye at 4 shillings a bushel must be given for 8 bushels of wheat at 6 shillings a bushel?

24. Bought 9 yards of broadcloth at 8 dollars a yard, and paid for it with flour at 12 dollars a barrel; how many barrels did it take?

25. Sold 12 tons of hay at 11 dollars a ton, and received pay in flour at 12 dollars a barrel; how many barrels did I receive?

FRACTIONS.

LESSON XXXIII.

1. If I cut an orange into 2 equal parts, what is one of those parts called? Ans. One half.

2. How many halves make a whole number?

3. If you cut an apple into 3 equal parts, what is one of those parts called? Ans. One third.

4. If one half of an orange is worth 2 cents, how many cents is a whole one worth?

A. — If one half is worth 2 cents, a whole one, or 2 halves, is worth twice as much; and twice 2 cents are 4 cents, Ans.

5. *If one third* of a barrel of flour is worth 2 dollars, *what cost a barrel?*

6. How many thirds in one?

7. William has 4 cents, and James has half as many; how many cents has James?

8. Lucy has 6 apples, and Jane has half as many; how many apples has Jane?

9. Henry had 6 peaches, and gave one third of them to Frank; how many did he give him?

10. If an apple be cut into 4 equal parts, what is one of those parts called? ANS. One fourth.

11. What are two of those parts called?

12. If one fourth of an apple cost 1 cent, what cost a whole apple?

13. What is one half of 4? 6? 8? 10? 12?

14. What is one third of 1? 3? 6? 9? 12?

15. What is one fourth of 1? 4? 8? 12?

16. James had 10 cents, and Thomas one half as many; how many cents had Thomas?

17. Lucy had 9 cents, and lost one third of them, how many had she left?

18. Maria had 12 pins, and gave Harriet one fourth of them; how many did she give her?

19. How many fifths in a whole one?

20. How many sixths in an orange?

21. How many sevenths in a bushel?

22. What is one fifth of 10?

23. What is one sixth of 12?

24. What is one seventh of 14?

25. If one seventh of a pound of sugar cost one cent, what cost a pound?

26. What is one fifth of 15?

27. What is 2 fifths of 15?

ANS. If one fifth of 15 is 3, 2 fifths is 2 times as much, and 2 times 3 are 6; therefore, 6 is 2 fifths of 15.

28. What is 1 fourth of 16? 2 fourths? 3 fourths?

29. If a bushel of quinces cost 12 shillings, what cost *one fourth* of a bushel? 2 fourths? 3 fourths?

30. If an orange is worth 3 cents, and it be cut into 3 equal parts, what is one of those parts, or one third of it, worth? What is the third of 3? What are two thirds of 3?

31. When wood is worth 4 dollars a cord, what part of a cord will 1 dollar buy? What part of a cord will 2 dollars buy?

32. If you can buy a yard of cloth for 3 dollars, how many yards can you buy for 4 dollars? How many for 5 dollars? How many for 6 dollars?

33. 4 are how many times 3? 6 are how many times 3?

34. If a pound of iron can be purchased for 3 cents, how many pounds will 7 cents purchase? 7 are how many times 3?

35. How many times 3 are there in 8?

36. 9 are how many times 3?

37. 10 are how many times 3?

38. How many times 3 in 11? 12 are how many times 3?

39. If you buy a bushel of corn for 4 shillings, and divide it into 4 equal parts, what will one of those parts, or one fourth of it, be worth? What will 2 fourths be worth? What will 3 fourths be worth?

40. What is one fourth of 4? ANS. One fourth of 4 is one.

41. 2 is what part of 4? 3 is what part of 4?

42. Bought a small piece of land for 6 dollars, and divided it into 6 equal parts; what was 1 part, or one sixth of it, worth? What were 2 sixths of it worth? What were 3 sixths of it worth? 4 sixths?

43. A gentleman divided 1 dollar equally among 9 boys; what part of the dollar did each boy receive? What part of the dollar did 2 boys receive? 3? 4? *5? 6? 7? 8?*

44. 1 is what part of 9? 2 is what part of 9? 3 is *what part of 9?*

LESSON XXXIV.

1. If you can buy a pound of raisins for 8 cents, what part of a pound can you buy for 1 cent? What part of a pound can you buy for 2 cents? 3 cents? 4 cents? 7 cents? 6 cents?

2. How can you tell how many eighths there are in a number?

Ans. If any thing or number be divided into 8 equal parts, one of those parts would be one eighth, and 2 parts would be 2 eighths.

3. A man bought a barrel of molasses for 9 dollars; what part could he buy for 1 dollar? What part for 2 dollars? 3 dollars? 5 dollars? 6 dollars? 8 dollars? How much for 10 dollars? 12 dollars?

4. Bought a quart of cherries for 10 cents; how many cents would one tenth of a quart cost? 2 tenths? 3 tenths? 4 tenths? 6 tenths? 8 tenths? 9 tenths?

5. Gave 10 dollars for an acre of wild land; what part of an acre would 1 dollar buy? What part would 2 dollars buy? 3 dollars? 4 dollars? 5 dollars? 7 dollars? 9 dollars? How much would 12 dollars buy? 14 dollars? 18 dollars? 20 dollars?

6. 10 are how many times 2? 4? 5? 6? 9? 8?

7. 11 are how many times 7? 8? 3? 6? 5? 9?

8. 9 are how many times 4? 5? 6? 7? 3? 8?

9. 8 are how many times 5? 6? 7? 4? 2? 3?

10. 12 are how many times 4? 5? 7? 8? 9? 6?

11. 14 are how many times 2? 3? 4? 6? 7? 8?

12. A boy had 16 cents; how many oranges could he buy at 4 cents apiece? How many at 5 cents apiece? How many at 7 cents? How many at 8 cents? How many at 9 cents? How many at 12 cents?

13. 16 are how many times 4? 5? 7? 8? 9? 10?

14. 17 are how many times 4? 5? 3? 6? 7? 9?

15. 18 are how many times 3? 4? 5? 7? 6? 9?

16. 20 are how many times 4? 10? 8? 5? 2? 9?

17. 22 are how many times 2? 4? 11? 5? 10?

18. A man had 24 dollars; how many barrels of flour could he buy with that sum, at 4 dollars a barrel? How many at 5 dollars a barrel? How many at 7 dollars a barrel? How many at 8 dollars a barrel?

19. 24 are how many times 4? 6? 8? 3? 7? 10?

20. 28 are how many times 3? 4? 6? 7? 8? 10?

21. 25 are how many times 5? 4? 3? 6? 8? 9?

22. 27 are how many times 3? 8? 9? 7? 6? 11? 2? 4? 5? 10? 12? 13? 14? 15? 16?

23. 30 are how many times 4? 5? 10? 3? 6? 7? 9? 8? 11? 12? 13? 14? 15? 16?

24. 32 are how many times 8? 4? 5? 7? 6? 9?

25. 35 are how many times 6? 7? 4? 5? 12?

26. 40 are how many times 5? 6? 8? 4? 10? 12? 2? 3? 7? 9? 13? 14? 15? 16? 17?

27. If a pound of coffee cost 6 cents, how many pounds can be bought for 46 cents? For 32 cents?

28. At 8 cents a pound, how many pounds of sugar can be bought for 48 cents? For 50 cents? For 58 cents? For 62 cents? For 64 cents?

29. 46 are how many times 5? 7? 8? 9? 10? 11? 12? 13? 14? 15? 18? 20?

30. 48 are how many times 6? 7? 4? 9? 8? 11?

31. A lady had 50 dollars; how many yards of silk could she purchase at 4 dollars a yard? How many could she purchase at 5 dollars a yard? How many at 10 dollars a yard? 8 dollars a yard?

32. 50 are how many times 5? 6? 7? 8? 10? *9? 2? 3? 4? 11? 12? 13? 20? 25?*

33. 56 are how many times 8? 9? 6? 4? 7? 5?

34. Bought a lot of lumber for 60 dollars; what was

one sixth of it worth? 2 sixths? 3 sixths? 4 sixths? 5 sixths?

35. What is one sixth of 60? 2 sixths? 3 sixths? 4 sixths? 5 sixths?

36. A farmer sold a wood-lot for 72 dollars; what cost one eighth? 2 eighths? 3 eighths? 5 eighths? 6 eighths? 7 eighths? 4 eighths?

37. What is one eighth of 72? 2 eighths? 3 eighths? 4 eighths? 5 eighths? 7 eighths? 9 eighths?

LESSON XXXV.

1. JOHN had 4 cents, which was one third of all the money he had; how much had he?

A. — If 4 is one third of some number, of course three thirds, or the whole number, will be 3 times as much; and 3 times 4 are 12; therefore, 4 is one third of 12.

2. I gave away 6 apples, which was one half of all I had; how many had I?

3. 6 is one half of what number?

4. Jane lost 5 cents, which was one fourth of all the money she had; how much had she?

5. 5 is one fourth of what number?

6. A farmer, being asked how many sheep he had, said that in one pen he had 7, which was one sixth of all he had; how many had he?

7. 7 is one sixth of what number?

8. Gave 8 dollars for my stove, which was one fourth as much as I gave for my sofa; how much did I give for my sofa?

9. *8 is one* fourth of what number?

10. *8 is one* third of what number?

11. 7 is one fifth of what number?
12. 9 is one fourth of what number?
13. Sold a book for 10 cents, which was one third of what it cost me; how much did it cost me?
14. Gave 11 cents to James, which was one fourth of what I gave to Henry; how much did I give to Henry?
15. 10 is one third of what number?
16. 11 is one fourth of what number?
17. Sold my apples for 12 dollars, which was one third as much as I received for my pears; how much did I receive for my pears?
18. 12 is one third of what number?
19. 12 is one half of what number?
20. 11 is one sixth of what number?
21. 9 is one seventh of what number?
22. 8 is one tenth of what number?
23. 10 is one fourth of what number?
24. 10 is one seventh of what number?
25. I have 4 dollars, which is one fifth of what I wish to divide among 10 men; how much would each receive?
26. 4 is one fifth of how many times 10?
27. 6 is one fourth of how many times 2?
28. 5 is one sixth of how many times 3?
29. 4 is one eighth of how many times 4?
30. 7 is one fifth of how many times 7?
31. 8 is one sixth of how many times 12?

LESSON XXXVI.

1. I GAVE 8 apples, which was two thirds of all I had, to a little girl; how many had I?

A. — If 8 was 2 thirds of all I had, of course one *third would be one* half of 2 thirds, or one half of 8; and *one half of 8 is 4*, and if 4 is one third, of course 3 thirds,

or the whole number, will be 3 times as much, and 3 times 4 are 12; therefore, 8 is 2 thirds of 12.

2. My vest cost 6 dollars, which was 3 fourths as much as I gave for my coat; what did my coat cost?

3. 6 is 3 fourths of what number?

4. A man, being asked how old he was, replied that his oldest son was 12 years old, which was just 2 fifths of his own age; how old was he?

5. 12 is 2 fifths of what number?

6. George gave away 8 of his plums, which was 4 fifths of all he had; how many had he?

7. 8 is 4 fifths of what number?

8. 9 is 3 sixths of what number?

9. 10 is 5 eighths of what number?

10. 12 is 3 fourths of what number?

11. 14 is 7 eighths of what number?

12. 16 is 4 ninths of what number?

13. 18 is 9 tenths of what number?

14. William has 20 cents in his pocket, which is 4 fifths of what he has in his money-box; how much has he in his money-box?

15. 20 is 4 fifths of what number?

16. 24 is 6 eighths of what number?

17. 30 is 3 elevenths of what number?

18. Bought 3 fourths of a ton of hay for 9 dollars; how much would a ton cost? How much flour at 6 dollars a barrel would it take to pay for the ton of hay?

19. 9 is 3 fourths of how many times 6?

20. James paid 10 cents for 5 sixths of a pound of figs; what cost a whole pound? How many oranges at 4 cents apiece would it take to pay for the pound of figs?

21. 10 is 5 sixths of how many times 4?

22. Sold 7 eighths of an acre of land for 14 dollars; what cost an acre? How many yards of cloth at 4 dollars a yard would it take to pay for an acre of the land?

23. 14 is 7 eighths of how many times 4?

24. Sold a horse for 24 dollars, which was only 3 ninths of what he cost me; how much did he cost me? When I bought him, I paid for him with wood at 6 dollars a cord; how many cords did it take?

25. 24 is 3 ninths of how many times 12?

26. A boy, being asked how many chickens he had, answered that his largest brood contained 20, which was 4 fifths of the whole number; and that the whole number was 5 times as many as he had in the smallest brood; how many had he, and how many were there in the smallest brood?

27. 20 is 4 fifths of how many times 5?

28. 24 is 4 fifths of how many times 10?

29. A teacher, being asked how many scholars he had, replied that the smallest number that had ever been present was 18, which was just 3 ninths of his whole number of scholars; how many scholars had he?

30. 18 is 3 ninths of how many times 6?

31. 30 is 3 fifths of how many times 10?

32. 28 is 4 sevenths of how many times 7?

33. 24 is 4 twelfths of how many times 9?

LESSON XXXVII.

1. James had 10 cents; he kept 2 fifths of them himself, and divided the rest equally among 3 of his brothers; how many cents did each receive?

2. 3 fifths of 10 are how many times 3?

3. A boy caught 16 fishes; he kept 3 eighths of them, and gave the remaining 5 eighths, equally, to 5 of his companions; how many did he give to each?

4. 5 eighths of 16 are how many times 5?

5. I have 24 cherries, and divide 5 sixths of them equally among 10 little girls; how many does each *girl receive*?

6. 5 sixths of 24 are how many times 10 ?

7. A farmer had 42 sheep, and sold 5 sevenths of them to 5 of his neighbors, each receiving an equal number; how many did each receive?

8. 5 sevenths of 42 are how many times 5 ?

9. I had 36 plums, and gave one sixth of them to Frank, and divided the rest equally among 5 little girls; how many did I give to Frank, and how many did each little girl receive ?

10. 5 sixths of 36 are how many times 5 ?

11. 4 ninths of 45 are how many times 10 ?

12. 6 eighths of 48 are how many times 12 ?

13. 7 ninths of 54 are how many times 6 ?

14. 3 fifths of 60 are how many times 4 ?

15. 4 tenths of 70 are how many times 7 ?

16. 3 elevenths of 44 are how many times 6 ?

17. 5 twelfths of 84 are how many times 7 ?

18. William had 64 peaches, and divided 5 eighths of them equally among 4 of his school-fellows; how many did he give to each ?

19. 5 eighths of 64 are how many times 4 ?

20. 5 ninths of 45 are how many times 5 ?

21. 4 twelfths of 96 are how many times 8 ?

22. 8 sixths of 72 are how many times 12 ?

23. 9 fifths of 40 are how many times 8 ?

LESSON XXXVIII.

1. If half of a barrel of flour cost 4 dollars, what will be the value of a barrel ?

A. — If one half of a barrel cost 4 dollars, a whole barrel, or 2 halves, will cost 2 times as much; and 2 times 4 dollars are 8 dollars.

2. If one third of a pound of raisins cost 2 cents, what will be the price of a pound?

3. If one third of a bushel of nuts cost 2 dollars, what cost 2 thirds of a bushel?

4. What cost 2 yards and one half of a yard of ribband, at 2 cents a yard?

B. — If one yard cost 2 cents, 2 yards will cost 2 times 2 cents, 4 cents; and if one yard cost 2 cents, one half a yard will cost one cent; which added to 4 cents, makes 5 cents, ANS.

5. 2 times 2 and one half of 2 are how many?

6. At 3 shillings a gallon, what cost 4 gallons and one third of a gallon of oil?

7. 4 times 3 and one third of 3 are how many?

8. At 3 dollars a cord, what cost 4 cords and 2 thirds of a cord of wood?

9. 4 times 3 and 2 thirds of 3 are how many?

10. At 6 shillings a bushel, what cost 3 bushels and one third of a bushel of rye?

11. If a box of sugar cost 5 dollars, what cost 4 boxes and 2 fifths of a box?

12. 4 times 5 and 2 fifths of 5 are how many?

13. If a barrel of flour cost 4 dollars, what cost 5 barrels and 2 fourths of a barrel?

14. 5 times 4 and 2 fourths of 4 are how many?

15. 3 times 5 and 2 fifths of 5 are how many?

16. 4 times 4 and 3 fourths of 4 are how many?

17. 6 times 3 and 2 thirds of 3 are how many?

18. When apples are worth 6 shillings a barrel, what cost 4 barrels and 5 sixths of a barrel? How much would 7 barrels and 4 sixths of a barrel cost?

19. 4 times 6 and 5 sixths of 6 are how many?

20. 7 times 6 and 4 sixths of 6 are how many?

21. 6 times 6 and 3 sixths of 6 are how many?

22. At 7 dollars a cord, what cost 3 cords and 1

seventh of a cord of wood? What will 4 cords and 4 sevenths of a cord cost?

23. 3 times 7 and 1 seventh of 7 are how many?

24. 4 times 7 and 4 sevenths of 7 are how many?

25. 5 times 7 and 5 sevenths of 7 are how many?

26. 3 times 5 and 4 fifths of 5 are how many?

27. 8 times 4 and 3 fourths of 4 are how many?

28. At 8 dollars a yard, what cost 3 yards and 1 eighth of a yard of cloth?

29. 3 times 8 and 1 eighth of 8 are how many?

30. 3 times 7 and 2 sevenths of 7 are how many?

31. 5 times 7 and 4 sevenths of 7 are how many?

32. 8 times 7 and 5 sevenths of 7 are how many?

33. 9 times 7 and 6 sevenths of 7 are how many?

34. When hay is 9 dollars a ton, what will 3 tons and 1 ninth of a ton cost? What will 5 tons and 3 ninths of a ton cost?

35. 3 times 9 and 1 ninth of 9 are how many?

36. 5 times 9 and 3 ninths of 9 are how many?

37. 6 times 9 and 5 ninths of 9 are how many?

38. 7 times 9 and 4 ninths of 9 are how many?

39. 2 times 10 and 1 tenth of 10 are how many?

40. 5 times 10 and 3 tenths of 10 are how many?

41. At 10 cents a pound, what cost 6 pounds and 3 tenths of a pound of raisins?

42. 6 times 10 and 3 tenths of 10 are how many?

43. At 9 cents a pound, what cost 8 pounds and 5 ninths of a pound of butter?

44. 8 times 9 and 5 ninths of 9 are how many?

45. At 12 cents a pound, what cost 7 pounds and 6 twelfths of a pound of butter?

46. 12 times 7 and 6 sevenths of 7 are how many?

47. 12 times 8 and 4 eighths of 8 are how many?

48. At 9 dollars a yard, what cost 7 yards and 4 ninths of a yard of broadcloth?

49. 9 times 7 and 4 sevenths of 7 are how many?

50. 11 times 12 and 4 twelfths of 12 are how many?

51. Bought 4 pounds and 3 fourths of a pound of raisins at 8 cents a pound, and paid for them with berries at 5 cents a quart; how many quarts did it take?

52. 8 times 4 and 3 fourths of 4 are how many times 5?

53. 6 times 6 and 4 sixths of 6 are how many times 4?

54. 7 times 7 and 5 sevenths of 7 are how many times 6?

55. 10 times 4 and 2 fourths of 4 are how many times 7?

56. 9 times 6 and 2 sixths of 6 are how many times 8?

57. 11 times 6 and 4 sixths of 6 are how many times 10?

LESSON XXXIX.

QUESTIONS FOR GENERAL EXERCISE.

1. Bought 4 pounds of potash for 12 cents; what cost one pound?

2. If 3 pounds of raisins cost 18 cents, what cost 12 pounds?

3. Sold cloth for 48 dollars, and by so doing I gained 16 dollars; what did it cost me?

4. A trader bought 7 boxes of sugar for 56 dollars, and sold it at 9 dollars a box; how much did he gain on a box, and what did he gain on the whole?

5. A pier of a certain bridge stands 10 feet in the water, which is one third of the height of the pier; how high is the pier?

6. Two men, Smith and Brown, started in trade; Smith put in 20 dollars, and Brown 40 dollars; Smith *gained 3 fourths* as much as Brown put in, and Brown

gained 4 fifths as much as Smith put in; how much did each gain?

7. Lucy had 28 chestnuts, which was 4 sevenths as many as Mary had; how many had Mary?

8. James' father gave him 40 cents, and directed him to divide 7 eighths of it equally among his 5 brothers, and keep the rest himself; how much did each receive, and how much did James have for himself?

9. If 40 bushels of grain will keep 4 horses 6 days, how long will it keep 8 horses?

10. Four men can do a piece of work in 5 days; how long will it take 10 men to do the same work?

11. John's kite was 60 feet in the air, and Charles' only 2 fifths as high; how high was Charles' kite?

12. Two boys are to run 54 rods; the first boy runs 9 rods in a minute, and the second runs 6 rods in a minute; in how many minutes will each boy run the distance?

13. If 10 men can build a fence in 8 days, how many men will it take to build it in 5 days?

14. A farmer raised 40 bushels of apples, and 3 fifths as many pears; how many pears did he raise?

15. A trader bought 12 barrels of flour at 5 dollars a barrel, and sold it all for 75 dollars; how much did he gain on the whole?

16. If 8 men can do a piece of work in 9 days, how long will it take one man to do the same work?

17. If 4 men can dig a sewer in 8 days, how many men must be employed to do it in one day?

18. Peter was 40 rods ahead of Charles; Peter runs 5 rods in a minute, and Charles 7 rods in a minute; how long will it take Charles to catch Peter?

19. My watch cost 40 dollars, and my chain cost 2 fifths as much as my watch; what cost the chain?

20. If 6 cents are given for 3 books, what cost 12 books?

21. A man wished to draw the water from a well,

containing 120 gallons, but found, that while he could draw out 12 gallons in a minute, 8 gallons would run in during the same time; how long would it take him to draw out the whole quantity of water?

22. Four little girls wished their father to divide 50 cents equally among them. "No," said he, "but I will give you 4 fifths of it, and one half of the remaining fifth to the one that will tell how to divide it." How much did each receive?

23. Farmer Jones has a field of grain, which 4 men can reap in 8 days, but being in great haste, he wishes the work done in one day; how many men must he employ?

24. If 6 pounds of sugar cost 48 cents, what cost 12 pounds?

LESSON XL.

1. A FARMER, being asked how many sheep he had, replied, that he had 6 cows, and that 2 thirds the number of cows was just one fourth the number of sheep; how many sheep had he?

2. 2 thirds of 6 is one fourth of what number?

3. James' father asked him, upon his return from school, how many correct answers he had given in arithmetic that day; James replied, that he had given 8 *imperfect* answers, and that 3 fourths of the imperfect answers was just 2 thirds of the number of perfect answers; how many perfect answers had he given?

4. 3 fourths of 8 is 2 thirds of what number?

5. Frank had 2 bags filled with nuts, and his brother wished to buy one of them. "Well," said Frank, "I have 9 quarts in the smaller bag, and 2 thirds of that *number is just* one half the number of quarts in the

larger bag; and if you will tell me the number of quarts in the larger bag, I will *give* them to you." How many were there?

6. 2 thirds of 9 is one fourth of what number?
7. 3 fourths of 12 is 1 third of what number?
8. 4 fifths of 10 is 4 fifths of what number?
9. 3 eighths of 16 is 3 sevenths of what number?
10. 5 ninths of 36 is 2 fifths of how many times 10?
11. 2 fifths of 15 is 3 fourths of how many times 4?
12. 4 tenths of 30 is 2 thirds of how many times 3?
13. 5 sixths of 18 is 3 fifths of how many times 5?
14. A gentleman, having some fine pears in 2 baskets, which he wished to give to his 4 daughters, said to them, "In the small basket there are 12 pears, and 2 thirds of these is 2 sixths of the number in the large basket, which I will divide first." How many would each receive?
15. 2 thirds of 12 is 2 sixths of how many times 4?
16. 4 fifths of 30 is 3 fourths of how many times 8?
17. 5 sixths of 42 is 7 eighths of how many times 10?
18. 4 ninths of 36 is 2 fourths of how many times 8?

LESSON XLI.

A. — PARTS of whole numbers are called Fractions, or *broken* numbers. In the preceding lessons, we have made use of fractions, but they have been expressed by *words*. We shall find it more convenient, hereafter, to express fractions by figures. Thus —

One half	is	written	$\frac{1}{2}$
One third	"	"	$\frac{1}{3}$
One fifth	"	"	$\frac{1}{5}$
One seventh	"	"	$\frac{1}{7}$
Two thirds	"	"	$\frac{2}{3}$
Four fifths	"	"	$\frac{4}{5}$
Seven ninths	"	"	$\frac{7}{9}$

B. — In these expressions, we make use of two terms, called the *numerator* and the *denominator*. The numerator is written above a horizontal line, and the denominator below it. The denominator shows into how many parts the whole number is divided, and the numerator shows how many of those parts are used. Thus, in the expression, $\frac{2}{3}$ of an apple, the 3 informs us that the apple is divided into thirds, or three equal parts, and the 2 informs us how many of those parts, or thirds, are used.

1. The pupil may express the following fractions, in figures, on a slate.

Three fifths, eight ninths, seven eighths, two thirds, four ninths, eight tenths, twelve fourteenths, thirteen fifteenths, nine elevenths.

C. — When the numerator of a fraction is *smaller* than the denominator, we call it a *proper* fraction, because it is less than one, as $\frac{2}{3}$, $\frac{4}{5}$, $\frac{16}{18}$. When the numerator of a fraction is equal to or larger than the denominator, we call it an *improper* fraction, because it is equal to or larger than one, as $\frac{2}{2}$, $\frac{4}{2}$, $\frac{6}{3}$, $\frac{8}{8}$, $\frac{14}{12}$.

D. — When a fraction is written at the right hand of a whole number, the whole expression is called a *mixed number*; as $4\frac{1}{2}$, $6\frac{3}{4}$, $14\frac{3}{5}$, $25\frac{6}{9}$.

LESSON XLII.

QUESTIONS TO FAMILIARIZE THE PUPIL WITH FRACTIONS EXPRESSED BY FIGURES.

1. If $\frac{1}{2}$ of a barrel of flour cost 3 dollars, what cost a *barrel?*

2. *If* $\frac{1}{3}$ *of* a bushel of oats cost 2 shillings, what cost *a whole bushel?*

3. James had 6 apples, and gave $\frac{1}{3}$ of them away; how many had he left?

4. William had $\frac{1}{4}$ of a dollar, and Charles had $\frac{2}{4}$; how many fourths had both?

5. In 3 how many times $\frac{1}{3}$?

6. In 4 how many times $\frac{1}{4}$?

7. In 6 how many times $\frac{1}{5}$?

8. In 7 how many times $\frac{1}{2}$?

9. In 9 how many times $\frac{1}{6}$?

10. Express $4\frac{1}{2}$ by an improper fraction.

A. — $4\frac{1}{2}$ is a mixed number, and to express its value by an improper fraction, we multiply the whole number, 4, by the denominator, 2, and add to the product the numerator, 1, and we find we have 9; this is written over the denominator, and we have the improper fraction $\frac{9}{2}$.

11. Express $6\frac{1}{4}$ by an improper fraction.

12. Express $5\frac{3}{4}$ by an improper fraction.

13. Express $6\frac{2}{3}$ by an improper fraction.

14. Reduce $7\frac{2}{5}$ to an improper fraction.

15. Reduce $9\frac{5}{6}$ to an improper fraction.

16. Reduce $12\frac{3}{8}$ to an improper fraction.

17. Express $\frac{9}{2}$ by a mixed number.

B. — $\frac{9}{2}$ is an improper fraction, because it expresses more than one; and to express its value by a mixed number, we inquire how many times the numerator, 9, will contain the denominator, 2; 9 will contain 2 four times, and 1 remainder, or $\frac{1}{2}$ of 2. This $\frac{1}{2}$ is written at the right hand of 4, — thus, $4\frac{1}{2}$, Ans.

18. Express $\frac{8}{5}$ by a mixed number.

19. Reduce $\frac{12}{7}$ to a mixed number.

20. Reduce $\frac{14}{6}$ to a mixed number.

21. Reduce $\frac{17}{8}$ to a mixed number.

22. Reduce $\frac{25}{9}$ to a mixed number.

LESSON XLIII.

1. How much is 4 times $\frac{1}{3}$?
2. How much is 5 times $\frac{4}{5}$?
3. How much is 6 times $\frac{3}{5}$?
4. How much is 7 times $\frac{2}{7}$?
5. How much is 9 times $\frac{1}{2}$?
6. How much is 10 times $\frac{5}{8}$?
7. How much is 4 times $2\frac{1}{2}$?
8. How much is 6 times $3\frac{2}{3}$?
9. How much is 9 times $5\frac{2}{3}$?
10. How much is 8 times $4\frac{1}{2}$?
11. How much is 10 times $5\frac{2}{5}$?
12. How much is 12 times $6\frac{1}{4}$?
13. Sold 8 barrels of flour at $4\frac{1}{2}$ dollars a barrel; what did it come to?
14. Bought 7 yards of cloth at $5\frac{3}{4}$ dollars a yard; what did I pay?
15. If a man can walk $3\frac{1}{2}$ miles in one hour, how far will he travel in 8 hours?
16. Paid $5\frac{1}{2}$ dollars apiece for 7 chairs; what did they cost?
17. Bought 4 barrels of flour at $4\frac{1}{2}$ dollars a barrel, and sold it for $6\frac{1}{4}$ dollars a barrel; how much did I gain?
18. John Jones informs me that his family consumes $\frac{3}{4}$ of a barrel of flour in one week; how much would they consume in 2 weeks? In 4 weeks? In 5 weeks? In 6 weeks? In 7 weeks? In 9 weeks? In 11 weeks? In 12 weeks? In 20 weeks?
19. Gave $\frac{1}{16}$ of a dollar for a peck of apples; what cost 2 pecks? 3 pecks? 4 pecks? 5 pecks? 6 pecks? 7 pecks? 8 pecks? 12 pecks? 15 pecks?
20. Gave $\frac{7}{16}$ of a dollar for a bushel of cherries; what *cost 3 bushels?* 5 bushels? 7 bushels? 8 bushels? *12 bushels?* 15 bushels? 20 bushels?

21. Sold J. Pearson $\frac{3}{11}$ of a bushel of parsnips for one shilling; how many should he receive for 5 shillings? For 6 shillings? For 7 shillings? For 9 shillings? For 11 shillings?

22. A teacher gave $\frac{1}{8}$ of a dollar for 1 dozen of Mental Arithmetics; how much should he give for 2 dozen? For 3 dozen? For 4 dozen? For $\frac{1}{2}$ of a dozen? For 6 dozen?

23. If a barrel of flour cost $5\frac{3}{8}$ dollars, what cost 2 barrels? 3 barrels? 4 barrels? 5 barrels? 10 barrels? 6 barrels? 7 barrels? 8 barrels? 9 barrels? 11 barrels?

24. How many are 6 times $1\frac{1}{3}$? $3\frac{1}{2}$? $3\frac{3}{4}$? $4\frac{3}{7}$? $5\frac{1}{2}$? $5\frac{3}{7}$? $5\frac{1}{6}$? $6\frac{3}{4}$? $8\frac{1}{2}$? $8\frac{3}{7}$? $8\frac{4}{5}$? $7\frac{1}{2}$? $8\frac{1}{6}$? $9\frac{3}{8}$? $10\frac{2}{5}$?

25. How many are 7 times $2\frac{2}{4}$? $3\frac{2}{3}$? $4\frac{3}{5}$? $5\frac{4}{7}$? $7\frac{1}{4}$? $8\frac{3}{11}$? $8\frac{7}{8}$? $9\frac{1}{2}$? $11\frac{1}{4}$? $4\frac{3}{7}$? $5\frac{8}{11}$? $6\frac{1}{7}$? $4\frac{1}{2}$? $12\frac{3}{7}$?

26. How many are 8 times $1\frac{7}{8}$? $2\frac{3}{4}$? $3\frac{4}{5}$? $4\frac{6}{7}$? $5\frac{3}{7}$? $6\frac{4}{8}$? $7\frac{1}{7}$? $3\frac{3}{7}$? $4\frac{1}{2}$? $6\frac{3}{7}$? $8\frac{3}{11}$? $7\frac{1}{3}$? $6\frac{3}{11}$? $7\frac{4}{11}$? $9\frac{1}{2}$?

27. How many are nine times $1\frac{1}{4}$? $2\frac{4}{5}$? $3\frac{1}{6}$? $4\frac{4}{7}$? $8\frac{6}{11}$? $9\frac{1}{10}$? $10\frac{1}{3}$? $11\frac{1}{4}$? $6\frac{3}{7}$? $4\frac{2}{3}$? $7\frac{1}{3}$? $7\frac{1}{4}$? $6\frac{3}{7}$? $4\frac{3}{7}$? $9\frac{3}{5}$?

28. Bought a peck of quinces for $6\frac{1}{4}$ cents; what cost 2 pecks? What cost 3 pecks? 5 pecks? 6 pecks? 7 pecks? 8 pecks? 9 pecks? 10 pecks? 11 pecks? 12 pecks?

29. Paid $5\frac{3}{8}$ dollars to F. Johnson for one barrel of his extra superfine flour; what must I give for 2 barrels? For 3 barrels? For 4 barrels? For 5 barrels? For 6 barrels? For 8 barrels? For 10 barrels? For 11 barrels?

30. A pedestrian walked $9\frac{3}{4}$ miles in one hour; how far, at that rate, could he travel in 4 hours? How far *in 5 hours? 6 hours? 7 hours? 8 hours? 9 hours? 11 hours?*

LESSON XLIV.

1. WHAT is $\frac{1}{3}$ of 2?

A. — If one pear be divided into 3 equal parts, one of these parts is $\frac{1}{3}$; and if 2 pears be divided into 3 equal parts each, two of these parts are $\frac{2}{3}$. Therefore, $\frac{1}{3}$ of 2 is $\frac{2}{3}$ of one.

2. What is $\frac{1}{3}$ of 5? Of 6? Of 7? Of 8? Of 9?
3. What is $\frac{1}{5}$ of 7? Of 6? Of 8? Of 9? Of 10?
4. What is $\frac{1}{6}$ of 9? Of 8? Of 10? Of 7? Of 4?
5. What is $\frac{1}{4}$ of 10? Of 9? Of 8? Of 11? Of 12?
6. What is $\frac{2}{3}$ of 7? Of 8? Of 9? Of 10? Of 11?
7. What is $\frac{1}{4}$ of 6? Of 7? Of 8? Of 9? Of 10? Of 11? Of 12? Of 14? Of 15? Of 16? Of 20? Of 24? Of 28?
8. How many are $\frac{3}{4}$ of 8? Of 9? Of 10? Of 11? Of 12? Of 13? Of 14? Of 15? Of 16? Of 18? Of 20? Of 24?
9. How many are $\frac{1}{5}$ of 4? Of 5? Of 6? Of 7? Of 8? Of 12? Of 9? Of 10? Of 11? Of 16? Of 17? Of 20? Of 30?
10. How many are $\frac{2}{5}$ of 3? Of 5? Of 7? Of 9? Of 10? Of 12? Of 16? Of 17? Of 18? Of 20? Of 24? Of 30? Of 33?
11. How many are $\frac{3}{5}$ of 7? Of 8? Of 9? Of 10? Of 11? Of 12? Of 15? Of 16? Of 17? Of 18? Of 19? Of 20? Of 25?
12. How many are $\frac{4}{5}$ of 3? Of 4? Of 5? Of 7? Of 10? Of 12? Of 9? Of 11? Of 13? Of 15? Of 16? Of 18? Of 19?
13. How many are $\frac{1}{6}$ of 7? Of 8? Of 9? Of 11? Of 12? Of 13? Of 14? Of 10? Of 15? Of *16? Of 20?* Of 26? Of 28?
14. *How* many are $\frac{5}{6}$ of 4? Of 5? Of 7? Of 8?

Of 11? Of 12? Of 13? Of 15? Of 16? Of 17? Of 18? Of 20? Of 24?

15. James and John bought a barrel of molasses, for which they paid 14 dollars; James paid $\frac{3}{7}$ and John the remainder; how much did each pay?

16. Two men, Ames and Johnson, make on a speculation 42 dollars, $\frac{4}{7}$ of this sum belonging to Ames, and the remainder to Johnson; how many dollars does each receive?

17. Gave 45 cents to Thomas and Samuel; Thomas is to have $\frac{5}{9}$ of them, and Samuel the remainder; how many cents does each receive?

18. James received $\frac{4}{7}$ of a certain number of marbles, his share being 25; Richard is to have the remainder; how many does he receive?

19. Bought a load of bricks for 36 dollars, and paid $\frac{5}{9}$ of it; how much did I then owe? How much is $\frac{5}{9}$ of 36?

20. Sold a horse for 64 dollars, which was $\frac{8}{9}$ of what he cost me; what did he cost me? How much did I make by the bargain?

21. A boy having 66 cents, gave $\frac{3}{11}$ of them to his mother; how many did he give her? How many had he left?

LESSON XLV.

1. Gave $\frac{1}{4}$ of an apple to one boy, $\frac{2}{4}$ to another, and $\frac{3}{4}$ to another; how many fourths did I give away? How many whole apples?

2. $\frac{1}{4}$ and $\frac{2}{4}$ and $\frac{3}{4}$ are how many fourths? How many times 1?

3. *I have* several apples divided into sixths, and wish *to give* $\frac{1}{6}$ *to* James, $\frac{2}{6}$ to Frank, $\frac{1}{6}$ to Lucy, and $\frac{3}{6}$ to

Ann; how many sixths do I give away? How many apples?

4. $\frac{1}{6}$ and $\frac{2}{6}$ and $\frac{5}{6}$ and $\frac{3}{6}$ are how many sixths? How many times 1?

5. Gave a boy $\frac{1}{2}$ of an apple; how many fourths did I give him?

A. — Two halves make one, and four fourths make one. So you perceive that there are twice as many fourths in a number as there are halves; therefore, $\frac{1}{2}$ is equal to $\frac{2}{4}$.

6. Gave James $\frac{1}{2}$ of an orange; how many fourths did he have?

7. Gave $\frac{1}{2}$ of a dollar to Lydia, and $\frac{2}{4}$ to Sarah; to whom did I give the most?

8. Sold $\frac{1}{2}$ of an acre of land to one man, $\frac{1}{4}$ to another, and $\frac{1}{4}$ to another; how many fourths did I sell? How many acres?

9. $\frac{1}{2}$ and $\frac{2}{4}$ and $\frac{1}{4}$ are how many fourths? How many times 1?

10. John had $\frac{1}{3}$ of a dollar; how many sixths had he?

11. $\frac{1}{3}$ are how many sixths?

12. Gave $\frac{1}{3}$ of a dollar to one man, and $\frac{2}{6}$ to another; how many sixths did I give away?

13. $\frac{2}{3}$ are how many sixths?

14. A man bought $\frac{1}{3}$ of an acre of land at one time, and $\frac{2}{6}$ of an acre at another time; how many thirds did he buy?

15. Which is the most, $\frac{1}{3}$ or $\frac{2}{6}$?

16. If you wish to give $\frac{1}{2}$ of a bushel of corn to one man, and $\frac{1}{3}$ to another, how many sixths would you give them both?

17. A man had a quantity of fruit, which he wished to divide among 3 of his friends; he gave $\frac{1}{2}$ to one, $\frac{1}{4}$ to another, and $\frac{1}{8}$ to another; how many eighths did each receive? How many eighths had he left?

18. $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{8}$ are how many eighths?

19. A lady had a fine pine-apple, which she wished to divide among her children. She commenced by giving $\frac{1}{3}$ to one, $\frac{1}{4}$ to another, $\frac{1}{6}$ to another, and $\frac{1}{12}$ to another; how many twelfths did she give to each, and how many twelfths had she left?

20. A gentleman kept 3 fires in his house, during the winter. The first fire consumed $\frac{2}{3}$ of a ton of coal, the second $\frac{1}{2}$, and the third $\frac{1}{6}$ of a ton; how many sixths did they all consume? How many sixths did each fire consume? How many tons did all consume?

21. $\frac{1}{3}$ and $\frac{1}{4}$ and $\frac{1}{6}$ and $\frac{1}{12}$ are how many twelfths?

22. $\frac{2}{3}$ and $\frac{1}{2}$ and $\frac{1}{6}$ are how many sixths?

23. A farmer had a bushel of peaches, and sold $\frac{1}{4}$ of them to one man, $\frac{2}{5}$ to another, and $\frac{2}{10}$ to another; how many twentieths did he sell to each? How many twentieths did he sell in all?

24. $\frac{1}{2}$ is how many twentieths?

25. $\frac{1}{10}$ is how many twentieths?

26. $\frac{1}{4}$ is how many twelfths?

27. $\frac{1}{6}$ is how many eighteenths?

28. $\frac{1}{7}$ is how many fourteenths?

29. $\frac{1}{3}$ is how many ninths?

30. How many sixths in $\frac{1}{2}$ and $\frac{2}{3}$?

31. How many fourths in $\frac{3}{8}$ and $\frac{3}{12}$?

32. Which is the most, $\frac{1}{2}$ or $\frac{6}{12}$?

33. Which is the most, $\frac{2}{3}$ or $\frac{8}{12}$?

34. Change $\frac{1}{4}$ and $\frac{3}{4}$ and $\frac{5}{6}$ to twelfths.

35. $\frac{1}{2}$ and $\frac{4}{5}$ and $\frac{3}{10}$ and $\frac{3}{4}$ are how many twentieths?

36. $\frac{1}{4}$ and $\frac{1}{6}$ and $\frac{4}{5}$ and $\frac{2}{3}$ and $\frac{3}{10}$ are how many thirtieths?

37. $\frac{4}{5}$ and $\frac{3}{8}$ and $\frac{1}{4}$ and $\frac{3}{10}$ are how many fortieths?

38. $\frac{1}{3}$ and $\frac{3}{4}$ and $\frac{5}{6}$ and $\frac{7}{8}$ are how many twenty-fourths?

39. $\frac{4}{5}$ and $\frac{2}{6}$ and $\frac{3}{10}$ and $\frac{2}{3}$ are how many thirtieths?

40. $\frac{3}{4}$ and $\frac{4}{5}$ and $\frac{3}{8}$ and $\frac{2}{10}$ are how many fortieths?

41. $\frac{2}{6}$ and $\frac{4}{9}$ and $\frac{1}{3}$ and $\frac{4}{6}$ are how many eighteenths?

42. $\frac{4}{6}$ and $\frac{2}{4}$ and $\frac{2}{3}$ and $\frac{3}{12}$ are how many thirty-sixths?

LESSON XLVI.

A. — If you cut an apple into halves, and then into fourths, you will perceive that $\frac{2}{4}$ is the same as, or equal to, $\frac{1}{2}$; and if you divide an apple into thirds, and then into sixths, you will find that $\frac{4}{6}$ is equal to $\frac{2}{3}$. This method of finding the lowest expression of a fraction is called reducing fractions to the lowest terms. This should be illustrated by the teacher upon the black-board.

B. — Fractions can easily be reduced to the lowest terms, by dividing the numerator and denominator by the greatest number that will divide both without a remainder.

1. Reduce $\frac{2}{4}$ to its lowest terms.
2. Reduce $\frac{3}{6}$ to its lowest terms.
3. Reduce $\frac{4}{6}$ to its lowest terms.
4. Find the lowest expression of $\frac{4}{8}$.
5. Find the lowest expression of $\frac{6}{9}$.
6. Express $\frac{5}{10}$ by its lowest terms.
7. Reduce $\frac{4}{12}$ to its lowest terms.
8. Reduce $\frac{7}{14}$ to its lowest terms.
9. Reduce $\frac{5}{15}$ to its lowest terms.
10. Reduce $\frac{6}{18}$ to its lowest terms.
11. Reduce $\frac{8}{24}$ to its lowest terms.
12. Reduce $\frac{9}{27}$ to its lowest terms.
13. Reduce $\frac{8}{32}$ to its lowest terms.
14. Reduce $\frac{14}{28}$ to its lowest terms.
15. Reduce $\frac{24}{48}$ to its lowest terms.
16. Reduce $\frac{15}{60}$ to its lowest terms.
17. Reduce $\frac{9}{72}$ to its lowest terms.
18. Reduce $\frac{12}{96}$ to its lowest terms.
19. Reduce $\frac{42}{84}$ to its lowest terms.
20. Reduce $\frac{24}{96}$ to its lowest terms.
21. Reduce $\frac{60}{80}$ to its lowest terms.
22. Reduce $\frac{25}{100}$ to its lowest terms.

LESSON XLVII.

1. GAVE my youngest daughter, Lydia, $\frac{1}{5}$ of an orange, which she divided equally among 4 little girls; what part of the orange did each receive?

A. — If an orange be divided into 5 equal parts, one of those parts is one fifth; and if each of those fifths be divided into 4 other equal parts, the orange will then be divided into 20 equal parts. Therefore, each girl will receive $\frac{1}{20}$ of the orange.

2. What is $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{4}$ of $\frac{1}{3}$? $\frac{1}{6}$ of $\frac{1}{7}$? $\frac{1}{8}$ of $\frac{1}{9}$? $\frac{1}{2}$ of $\frac{1}{4}$?

3. What is $\frac{1}{5}$ of $\frac{1}{3}$? $\frac{1}{8}$ of $\frac{1}{3}$? $\frac{1}{7}$ of $\frac{1}{8}$? $\frac{1}{8}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{8}$? $\frac{1}{6}$ of $\frac{1}{8}$? $\frac{1}{7}$ of $\frac{1}{2}$? $\frac{1}{7}$ of $\frac{1}{11}$? $\frac{1}{6}$ of $\frac{1}{7}$? $\frac{1}{5}$ of $\frac{1}{4}$? $\frac{1}{7}$ of $\frac{1}{7}$? $\frac{1}{2}$ of $\frac{1}{10}$?

4. What is $\frac{1}{2}$ of $\frac{1}{5}$? $\frac{1}{2}$ of $\frac{1}{6}$? $\frac{1}{3}$ of $\frac{1}{7}$? $\frac{1}{3}$ of $\frac{1}{9}$? $\frac{1}{3}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{3}$? $\frac{1}{3}$ of $\frac{1}{3}$? $\frac{1}{4}$ of $\frac{1}{4}$? $\frac{1}{5}$ of $\frac{1}{4}$? $\frac{1}{7}$ of $\frac{1}{2}$? $\frac{1}{6}$ of $\frac{1}{7}$? $\frac{1}{3}$ of $\frac{1}{3}$?

5. A gentleman owned $\frac{7}{11}$ of an acre of land, and he gave $\frac{4}{5}$ of it to his eldest son; what part of an acre did his son receive? ANS. $\frac{28}{55}$ of an acre.

B. — His son received $\frac{4}{5}$ of $\frac{7}{11}$ of an acre. $\frac{1}{5}$ of $\frac{7}{11}$ is $\frac{7}{55}$, and $\frac{4}{5}$ is 4 times $\frac{7}{55}$, which is $\frac{28}{55}$.

6. What is $\frac{2}{3}$ of $\frac{1}{2}$? $\frac{2}{3}$ of $\frac{7}{8}$? $\frac{3}{7}$ of $\frac{1}{3}$? $\frac{3}{8}$ of $\frac{5}{6}$? $\frac{4}{5}$ of $\frac{3}{7}$?

7. What is $\frac{3}{4}$ of $\frac{5}{6}$? $\frac{7}{8}$ of $\frac{9}{10}$? $\frac{2}{5}$ of $\frac{3}{4}$? $\frac{7}{8}$ of $\frac{3}{4}$? $\frac{6}{7}$ of $\frac{2}{5}$?

8. What is $\frac{7}{11}$ of $\frac{1}{5}$? $\frac{8}{9}$ of $\frac{1}{2}$? $\frac{3}{5}$ of $\frac{1}{7}$? $\frac{4}{7}$ of $\frac{7}{8}$? $\frac{8}{9}$ of $\frac{2}{4}$?

9. John has a quarter of a dollar, and he gives one quarter of it to James; what part of the dollar does James receive, and what part does John retain?

10. A lady bought one quart of milk, and gave

a pint of it to a boy; what part of a gallon had she left?

11. A man owned $\frac{4}{5}$ of a house, and sold $\frac{1}{2}$ of it; what part of the house did he sell? what part had he left?

12. William had $\frac{3}{4}$ of a pear, which he wished to divide equally among 3 of his school-fellows; what part would each receive?

13. $\frac{1}{3}$ of $\frac{3}{4}$ is what fraction?

14. A gentleman, owning $\frac{4}{5}$ of an estate, lost $\frac{2}{3}$ of it; what part of the whole estate did he lose, and what part had he left?

15. What is $\frac{2}{3}$ of $\frac{4}{5}$?

16. What is $\frac{3}{4}$ of $\frac{5}{6}$?

17. What is $\frac{6}{7}$ of $\frac{8}{9}$?

18. What is $\frac{9}{10}$ of $1\frac{1}{2}$?

19. What is $\frac{7}{8}$ of $\frac{4}{10}$?

20. If one box of butter is worth $4\frac{1}{2}$ dollars, what is $\frac{1}{2}$ of a box worth?

C. — Reduce $4\frac{1}{2}$ to an improper fraction, and then proceed as in the other questions.

21. A man had $2\frac{1}{2}$ dollars, which he wished to divide among 3 poor men; what part did each receive?

22. What is $\frac{1}{3}$ of $4\frac{1}{2}$?

23. What is $\frac{1}{3}$ of $2\frac{1}{2}$?

24. What is $\frac{2}{3}$ of $3\frac{1}{4}$?

25. If 4 pounds of sugar cost $18\frac{1}{2}$ cents, what is the cost of one pound?

26. What is $\frac{1}{4}$ of $8\frac{1}{2}$?

27. A man gave $5\frac{1}{4}$ dollars for 2 pounds of opium; what cost one pound?

28. What is $\frac{1}{6}$ of $5\frac{1}{4}$?

29. Bought 6 yards of cloth for $12\frac{3}{4}$ dollars; what *was the cost of* one yard? What cost 3 yards?

30. What is $\frac{1}{6}$ of $12\frac{3}{4}$?

31. What is $\frac{1}{8}$ of $16\frac{1}{2}$?

32. What is $\frac{4}{5}$ of $10\frac{1}{2}$?

33. Sold 9 barrels of apples for $18\frac{3}{4}$ dollars; what cost one barrel?

34. What is $\frac{1}{3}$ of $18\frac{3}{4}$?

LESSON XLVIII.

1. James, having 2 apples, wished to give $\frac{1}{4}$ of an apple apiece to his brothers; to how many could he give them?

2. How many times $\frac{1}{4}$ are there in 2?

3. If James had given $\frac{3}{4}$ of an apple to each of his brothers, to how many could he have given them?

4. How many times $\frac{2}{4}$ are there in 2?

5. I have 4 fine pears, and wish to give $\frac{2}{5}$ of a pear apiece to several little girls; to how many little girls can I give them?

6. How many $\frac{2}{5}$ are there in 4?

7. If $\frac{2}{5}$ of a barrel of pork will supply a man 1 year, how long will 6 barrels last?

8. How many $\frac{2}{5}$ are there in 7? In 8?

9. If a boy spend $\frac{3}{4}$ of a dollar in one week, how long will 6 dollars last him?

10. How many times $\frac{3}{4}$ in 6?

11. A man can earn a dollar in $\frac{2}{5}$ of a day; how much can he earn in $4\frac{2}{5}$ days?

12. In $4\frac{2}{5}$ how many times $\frac{2}{5}$?

13. William paid $1\frac{1}{3}$ dollars for his cap; how many can be bought for 4 dollars?

14. In 4, how many times $1\frac{1}{2}$ or $\frac{3}{2}$?

15. I have $6\frac{1}{2}$ melons, which I wish to give to some boys, giving $1\frac{1}{2}$ melons to each boy; to how many can I give them?

16. How many times $1\frac{1}{2}$ in $6\frac{1}{2}$?

17. If $1\frac{1}{3}$ dollars will pay one man for a day's work, how many men will $6\frac{2}{3}$ dollars pay?

18. How many times $1\frac{1}{3}$, or $\frac{4}{3}$, in $6\frac{2}{3}$?

19. James walked $1\frac{2}{3}$ miles in an hour; how long would it take him, at that rate, to walk 10 miles?

20. How many times $1\frac{2}{3}$, or $\frac{5}{3}$, in 10?

21. Paid $2\frac{1}{3}$ dollars for a cord of wood; how many cords can be obtained for 12 dollars?

22. How many times $2\frac{1}{3}$ in 12?

23. A boy has $12\frac{1}{2}$ cents; how many pens can he buy, at $1\frac{1}{2}$ cents each?

24. How many times $1\frac{1}{2}$ in $12\frac{1}{2}$?

25. How many times $2\frac{2}{3}$ in $9\frac{1}{3}$?

TABLES OF MONEY, WEIGHTS, and MEASURES.

LESSON XLIX.

Table of United States Money.

10 Mills	make	1 Cent,	marked	c.
10 Cents	"	1 Dime,	"	d.
10 Dimes	"	1 Dollar,	"	$.
10 Dollars	"	1 Eagle,	"	E.

1. How many mills in 1 cent? In 2 cents? In 4 cents? In 5 cents? In 6 cents? In 10 cents? In 12 cents? In 20 cents? In 30 cents? In 35 cents? In 40 cents? In 45 cents?

2. How many cents in 19 mills? In 20 mills? In *40 mills?* In 50 mills? In 70 mills? In 80 mills? *In 100 mills?* In 110 mills? In 140 mills? In 150 *mills?* In 200 mills? In 350 mills?

3. How many cents in 1 dime? In 2 dimes? In 4 dimes? In 5 dimes? In 7 dimes? In 8 dimes? In 9 dimes? In 10 dimes? In 14 dimes? In 20 dimes? In 25 dimes? In 35 dimes? In 50 dimes? In 100 dimes? In 110 dimes? In 120 dimes? In 140 dimes? In 150 dimes? In 155 dimes? In 175 dimes? In 200 dimes? In 160 dimes? In 180 dimes?

4. How many cents in 1 dollar? In 2 dollars? In 4 dollars? In 5 dollars? In 7 dollars? In 9 dollars? In 10 dollars? In 12 dollars? In 14 dollars? In 15 dollars? In 20 dollars? In 25 dollars?

5. How many dimes in 20 cents? In 40 cents? In 50 cents? In 80 cents? In 100 cents? In 110 cents? In 140 cents? In 150 cents? In 200 cents?

6. How many dimes in 1 dollar? In 2 dollars? In 4 dollars? In 6 dollars? In 8 dollars? In 10 dollars? In 12 dollars? In 15 dollars? In 20 dollars?

7. How many eagles in 10 dollars? In 20 dollars? In 40 dollars? In 70 dollars? In 80 dollars? In 90 dollars? In 100 dollars? In 120 dollars? In 150 dollars? In 180 dollars? In 200 dollars?

8. How many dollars in 2 eagles? In 4 eagles? In 6 eagles? In 9 eagles? In 12 eagles? In 20 eagles? In 40 eagles? In 50 eagles? In 70 eagles? In 80 eagles? In 85 eagles? In 100 eagles?

9. How many dimes in 20 cents? In 30 cents? In 40 cents? In 50 cents? In 70 cents? In 90 cents? In 100 cents? In 110 cents? In 120 cents? In 140 cents? In 150 cents? In 200 cents?

10. How many dollars in 20 dimes? In 40 dimes? In 100? How many cents in 1 eagle? In 2 eagles? In 4 eagles? In 5 eagles?

11. How many dimes in 1 eagle? In 2 eagles? In 3 eagles? In 4 eagles? In 6 eagles?

12. If you wish to divide a dollar among four of your *companions*, how many cents would you give to each? *How many* dimes to each?

LESSON L.

Table of English Money.

4 Farthings	make	1 Penny,	marked	d.
12 Pence	"	1 Shilling,	"	s.
20 Shillings	"	1 Pound,	"	£.
21 Shillings sterling . . .	"	1 Guinea,	"	guin.

1. How many pence in 8 farthings? In 12 farthings? In 16 farthings? In 20 farthings? In 24 farthings? In 32 farthings? In 36 farthings? In 40 farthings? In 44 farthings? In 48 farthings?

2. How many farthings in 2 pence? In 4 pence? In 6 pence? In 9 pence? In 10 pence? In 11 pence? In 12 pence? In 20 pence? In 24 pence? In 30 pence?

3. How many shillings in 12 pence? In 24 pence? In 48 pence? In 60 pence?

4. How many pence in 2 shillings? In 4 shillings? In 5 shillings? In 7 shillings? In 8 shillings? In 9 shillings? In 10 shillings? In 11 shillings? In 12 shillings? In 20 shillings?

5. In 20 shillings how many pounds? In 40 shillings? In 80 shillings? In 160 shillings?

6. How many shillings in 2 pounds? In 3 pounds? In 4 pounds? In 5 pounds? In 7 pounds? In 8 pounds? In 10 pounds?

7. What cost 4 pounds of rice at 3 pence per pound? At 4 pence? At 5 pence? At 6 pence?

8. How many shillings in 2 pounds 4 shillings?

9. How many pence in 5 shillings 6 pence? In 8 shillings 9 pence? In 10 shillings 3 pence?

10. How many farthings in 4 shillings? In 5 shillings? In 7 shillings?

11. How many farthings in 2 shillings 3 pence? In 3 shillings 9 pence?

LESSON LI.

Table of Troy Weight.

24 Grains	make	1 Pennyweight,	marked	dwt.
20 Pennyweights . .	"	1 Ounce, . . .	"	oz.
12 Ounces	"	1 Pound, . . .	"	lb.

Note. — By this weight are weighed gold, silver, and jewels.

1. How many pennyweights in 24 grains? In 48?
2. How many ounces in 20 pennyweights? In 40 dwt.? In 80 dwt.? In 100 dwt.?
3. In 12 ounces how many pounds? In 24 ounces? In 36 ounces? In 48 ounces? In 60 ounces? In 72 ounces? In 84 ounces?
4. If one silver spoon weigh 4 ounces, what will 6 spoons weigh? 8 spoons? 10 spoons? 12 spoons? 15 spoons?
5. Bought 3 ounces of gold for 48 dollars; what cost one ounce? 4 ounces? 5 ounces? 8 ounces? 9 ounces? 10 ounces? 12 ounces?
6. In 40 pennyweights and 3 ounces how many ounces?
7. In 6 pounds 4 ounces how many ounces?
8. How many pennyweights in 48 grains? How many in 96 grains?
9. A jeweller sold 10 dwt. of silver plate at 2 shillings a dwt.; how much did he receive?
10. In 4 pounds how many ounces? How many in 5 pounds?
11. In 3 ounces how many pennyweights?
12. How many grains in 2 pennyweights?
13. How many ounces in 24 pounds?
14. How many pennyweights in 12 ounces?
15. How many grains in 1 pound?
16. How many pennyweights in 2 pounds?

LESSON LII.

Table of Apothecaries' Weight.

20 Grains	. . . . .	make 1	Scruple,	marked	sc. or ℈.
3 Scruples	. . . .	" 1	Dram, .	"	dr. or ʒ.
8 Drams	. . . . .	" 1	Ounce, .	"	oz. or ℥.
12 Ounces	. . . . .	" 1	Pound, .	"	lb. or ℔.

Note. — The above table is used by apothecaries in mixing their medicines, but they buy and sell them by Avoirdupois.

1. How many grains in 1 scruple? How many in 2 scruples? In 3 scruples? In 4 scruples? In 5 scruples? In 7 scruples?
2. How many drams in 3 scruples? How many in 6 scruples? In 9 scruples? In 12 scruples? In 15 scruples? In 21 scruples?
3. How many drams in 1 ounce? How many in 2 ounces? In 4 ounces? In 6 ounces? In 7 ounces? In 8 ounces? In 9 ounces? In 12 ounces?
4. How many pounds in 12 ounces? In 24 ounces? In 36 ounces? In 48 ounces? In 60 ounces? In 72 ounces? In 84 ounces?
5. How many ounces in 1 pound? In 2 pounds? In 3 pounds? In 6 pounds? In 8 pounds? In 9 pounds? In 10 pounds? In 12 pounds?
6. In 16 drams how many ounces?
7. In 4 scruples how many grains?
8. In 5 pounds how many ounces?
9. How many drams in 7 ounces?
10. In 9 drams how many scruples?
11. How many drams in 1 pound?
12. How many drams in 4 ounces?
13. *How many* scruples in 1 pound?
14. *How many* grains in 3 drams?
15. *How many* grains in 4 scruples?

LESSON LIII.

Table of Avoirdupois Weight.

16 Drams	. . . . make	1 Ounce,	. . . . marked	oz.
16 Ounces	. . . . "	1 Pound,	. . . . "	lb.
25 Pounds	. . . . "	1 Quarter,	. . . "	qr.
4 Quarters	. . . "	1 Hundred-weight,	"	cwt.
20 Hundred-weight	"	1 Ton,	. . . . . "	ton.

Note. — By this weight are weighed almost every kind of goods, and all metals except gold and silver.

1. How many ounces in 1 pound? In 2 pounds?
2. How many ounces in 1 pound 6 ounces?
3. How many pounds in 16 ounces? How many pounds in 17 ounces? Ans. 1 pound 1 ounce.
4. In 20 ounces how many pounds? In 22 ounces? In 24 ounces? In 28 ounces? In 32 ounces?
5. In one hundred-weight how many quarters?
6. In 2 hundred-weight how many quarters? In 4 hundred-weight? In 6? In 8? In 10? In 12?
7. How many tons in 20 hundred-weight? How many in 40 hundred-weight? In 80 hundred-weight? In 60 hundred-weight? In 100 hundred-weight?
8. How many hundred-weight in 2 tons? In 3 tons? In 4 tons? In 5 tons? In 6 tons?
9. Bought 4 hundred-weight of sugar, at 9 dollars a hundred-weight; what was the cost?
10. How many drams in 1 ounce? In 2 ounces? In 3 ounces? In 4 ounces? In 5 ounces?
11. How many quarters in 6 cwt.?
12. How many pounds in 8 quarters?
13. How many ounces in 4 pounds?
14. How many drams in 1 pound?
15. How many quarters in 100 pounds?
16. How many ounces in 1 quarter?

LESSON LIV.

Table of Long Measure.

12	Inches	make 1	Foot, . . .	marked	ft.
3	Feet	" 1	Yard, . . .	"	yd.
5½	Yards, or 16½ Feet,	" 1	Rod, or Pole,	"	rd.
40	Rods	" 1	Furlong, .	"	fur.
8	Furlongs	" 1	Mile, . . .	"	m.
3	Miles	" 1	League, . .	"	lea.
69½	Miles (nearly) .	" 1	Degree, . .	" deg. or °.	
360	Degrees	" 1	Circle of the Earth.		

1. How many furlongs in 1 mile? In 2 miles? In 4 miles? In 5 miles? In 8 miles?
2. How many miles in 3 leagues? In 4 leagues? In 7 leagues? In 9 leagues? In 10 leagues?
3. How many furlongs in 30 rods? In 160 rods?
4. How many yards in 2 rods? In 4 rods? In 5 rods? In 6 rods? In 8 rods?
5. How many feet in 12 yards? In 6 yards? In 10 yards? In 15 yards? In 18 yards?
6. How many inches in 2 feet? In 4 feet? In 6 feet? In 8 feet? In 10 feet?
7. How many inches in 3 feet 6 inches?
8. How many furlongs in 80 rods? In 96 rods?
9. If a man can travel 45 miles in 9 hours, how far will he travel in 1 hour? How far in 4 hours? In 6 hours? In 8 hours? In 10 hours? In 12 hours?
10. There are 8 furlongs in 1 mile; how many furlongs in 6 miles? In 7 miles? In 9 miles?
11. In 4 feet how many inches?
12. In 3 furlongs how many rods?
13. If a man can travel 1 furlong in 5 minutes, how long will it take him to travel 1 mile?
14. *How many* inches in 1 yard?
15. *How many* furlongs in 4 leagues?
16. *How many* miles in 28 leagues?

LESSON LV.

Table of Cloth Measure.

2¼	Inches . .	make	1	Nail, ...	marked na.
4	Nails . . .	"	1	Quarter of a Yard,	" qr.
4	Quarters .	"	1	Yard, ...	" yd.
3	Quarters .	"	1	Ell Flemish, . . .	" E. F.
5	Quarters .	"	1	Ell English, . . .	" E. E.

1. How many nails in 1 quarter? In 2 quarters?

2. How many nails in 3 quarters? In 4 quarters? In 5 quarters? In 6 quarters? In 8 quarters? In 9 quarters?

3. How many quarters in 1 yard? In 4 yards? In 7 yards? In 9 yards? In 12 yards?

4. How many yards in 8 quarters? In 16 quarters? In 24 quarters? In 28 quarters?

5. How many quarters in 4 ells Flemish? In 7 ells? In 9 ells? In 12 ells?

6. How many ells English in 10 quarters? In 15 quarters? In 25 quarters? In 20 quarters? In 24 quarters?

7. What cost 2 yards and 1 quarter of a yard of cloth, at 4 dollars a quarter?

8. How many nails in 16 quarters? In 20 quarters? In 24 quarters? In 28 quarters?

9. What cost 10 yards of broadcloth at 5 dollars a yard? What cost 12 yards? 8 yards? 11 yards?

10. How many quarters in 16 nails?

11. How many yards in 20 quarters?

12. How many ells English in 30 quarters?

13. How many inches in 1 qr.?

14. What cost 4 yards of velvet at 3 dollars per quarter? At 4 dollars? 5 dollars? 6 dollars?

15. Bought 4 yards and 3 qrs. of cloth at 2 dollars *per quarter*; how much did it cost me?

LESSON LVI.

Table of Square Measure.

144	Square inches	make 1	Square foot,	marked	ft.
9	Square feet	" 1	Square yard,	"	yd.
30¼	Square yards	" 1	Square rod or pole,		p.
272¼	Square feet	" 1	Square rod or pole,		p.
40	Square rods	" 1	Rood	"	R.
4	Roods	" 1	Acre	"	A.
640	Acres	" 1	Square mile,	"	S. M.

1. How many square feet in 1 square yard? In 2 square yards? In 3 square yards? In 4 square yards? In 5 square yards? In 7 square yards? In 8 square yards? In 9 square yards?

2. How many square feet in 2 square yards 4 feet?

3. How many square yards in 27 square feet? In 36 square feet? In 37 square feet?

4. How many acres in 16 roods? In 20 roods?

5. How many roods in 4 acres? In 6 acres? In 7 acres? In 9 acres? In 10 acres?

6. What cost 12 acres of land at 9 dollars an acre?

7. How many square rods in a field 12 rods long, 9 rods wide?

8. What cost a piece of land 7 rods long, 6 rods wide, at 1 dollar a square rod?

LESSON LVII.

Cubic Measure.

1728	cubic inches	make 1	Foot.
27	" Feet	" 1	Yard.
40	" Feet of timber	" 1	Ton, marked T.
128	" Feet	" 1	Cord of wood.

Note.— If a pile of wood be 8 feet long, 4 feet wide, and 4 feet high, it contains 1 cord of wood.

1. *How many* cubic feet in 3 tons of timber?

2. How many cubic feet in 5 tons of timber?
3. What cost 7 cords of wood at 5 dollars a cord?
4. What cost 12 tons of timber at 7 dollars per ton?
5. What cost 50 cubic yards of marble at 10 dollars per yard?
6. How many cubic feet in 10 cubic yards?
7. How many cubic feet in 10 cords?
8. What cost 100 cords of wood at 10 dollars per cord?

LESSON LVIII.

Table of Wine Measure.

4 Gills	. . . .	make	1 Pint,	. . . marked	pt.
2 Pints	. . . .	"	1 Quart,	. . "	qt.
4 Quarts	. . . .	"	1 Gallon,	. . "	gal.
42 Gallons	. . .	"	1 Tierce,	. . "	tier.
63 Gallons	. . .	"	1 Hogshead,	. "	hhd.
2 Tierces	. . .	"	1 Puncheon,	. "	pun.
2 Hogsheads	. .	"	1 Pipe or butt,	"	pi.
2 Pipes or 4 Hhds.	"	1 Tun,	. . . "	tun.	

1. How many gills in 4 pints? In 2 pints? In 6 pints? In 8 pints? In 10 pints? In 12 pints?
2. How many quarts in 6 pints? In 8 pints? In 10 pints? In 12 pints? In 20 pints?
3. In 16 gallons how many quarts? In 20 gallons?
4. How many gills in one quart? In 2 quarts?
5. How many gills in one gallon? In 2 gallons?
6. In one tun, how many hogsheads? In 2 tuns? In 4 tuns? In 6 tuns? In 9 tuns? In 10 tuns?
7. What cost 8 gallons of vinegar at 5 cents a quart? At 6 cents? At 8 cents? At 12 cents?
8. What cost 9 hogsheads of molasses at 12 dollars a hogshead? At 9 dollars? At 7 dollars?
9. Gave 42 cents for 2 quarts of oil; what was it a *quart?* What cost a pint? What cost 4 quarts? 7 *quarts?* 9 quarts? 10 quarts? 12 quarts?

10. Bought 6 hogsheads of molasses for 54 dollars; what cost 1 hogshead? 2 hogsheads? 5 hogsheads? 7 hogsheads? 8 hogsheads? 9 hogsheads?

LESSON LIX.

Table of Ale and Beer Measure.

2 Pints	. . . make	1 Quart,	. . . marked	qt.
4 Quarts	. . . "	1 Gallon,	. . . "	gal.
32 Gallons	. . "	1 Barrel,	. . . "	bar.
54 Gallons	. . "	1 Hogshead,	. . "	hhd.
2 Hogsheads	. "	1 Butt,	. . . "	butt.
2 Butts	. . "	1 Tun,	. . . . "	tun.

1. In 2 quarts how many pints? In 4 quarts? In 8 quarts? In 12 quarts? In 16 quarts? In 24 quarts?

2. How many hogsheads in 1 butt? In 4 butts?

3. How much will 7 quarts of milk cost at 5 cents a quart? What cost 8 quarts? 9 quarts? 10 quarts? 11 quarts? 12 quarts? 15 quarts?

4. What cost 9 barrels of beer at 4 dollars a barrel? What cost 8 barrels? 10 barrels? 11 barrels? 12 barrels? 15 barrels? 18 barrels?

5. Bought 4 gallons of milk at 12 cents a gallon; what cost 1 gallon? 5 gallons? 6 gallons? 7 gallons? 9 gallons? 10 gallons? 12 gallons?

6. Sold 7 quarts of beer at 9 cents a quart; what was the cost? What cost 8 quarts? 9 quarts? 10 quarts? 11 quarts? 12 quarts?

7. Bought 9 quarts of milk for 54 cents; what was the cost of 1 quart? Of 2 quarts? Of 3 quarts? Of 4 quarts? Of 5 quarts? Of 7 quarts? Of 8 quarts?

8. *How* many gallons in 2 hogsheads?

9. *How* many quarts in 1 barrel? In 4 barrels?

20. *How* many pints in 1 barrel?

LESSON LX.

Table of Dry Measure.

2 Pints	make	1 Quart,	marked	qt.
4 Quarts	"	1 Gallon,	"	gal.
2 Gallons	"	1 Peck,	"	pk.
4 Pecks	"	1 Bushel,	"	bu.
36 Bushels	"	1 Chaldron,	"	ch.

Note. — This measure is applied to all Dry Goods, as Corn, Fruit, Salt, Coals, &c. A Winchester bushel is 18½ inches diameter, and 8 inches deep.

1. How many pints in 1 quart? In 2 quarts? In 4 quarts? In 6 quarts? In 8 quarts? In 10 quarts?

2. How many quarts in 12 pints? In 18 pints? In 20 pints? In 24 pints? In 30 pints?

3. How many pecks in 12 gallons? In 16 gallons? In 20 gallons? In 24 gallons? In 32 gallons? In 36 gallons? In 48 gallons?

4. How many gallons in 4 pecks? In 5 pecks? In 6 pecks? In 8 pecks? In 10 pecks?

5. In 2 bushels how many pecks? In 6 bushels? In 9 bushels? In 10 bushels? In 12 bushels?

6. How many pecks in 4 bushels? In 5 bushels? In 6 bushels? In 7 bushels? In 9 bushels?

7. In 6 pecks how many gallons? In 7 pecks? In 10 pecks? In 12 pecks? In 15 pecks?

8. How many pints in 1 gallon? In 2 gallons?

9. What cost 5 pecks of salt at 12 cents a peck?

10. What cost 9 bushels of corn at 4 shillings a bushels? What cost 7 bushels? 12 bushels?

11. What cost 12 quarts of cherries at 8 cents a quart? At 9 cents? At 12 cents?

12. At 9 cents a pint, what cost 12 pints of cranberries? 8 pints? 7 pints? 3 pints?

13. What costs 1 bushel of walnuts, at 6 cents per quart? At 7 cents?

LESSON LXI.

Table of Time.

60 Seconds, or 60″,	make	1 Minute,	. . .	marked	m.
60 Minutes . . .	"	1 Hour,	. . .	"	h.
24 Hours	"	1 Day,	. . .	"	d.
7 Days	"	1 Week,	. . .	"	w.
4 Weeks	"	1 Month,	. . .	"	mo.
52 Weeks	"	1 Year,	. . .	"	y.
12 Calendar Months	"	1 Year,	. . .	"	y.

A. — The following table will exhibit the names of the months, and the number of days in each.

1st	month,	January,	has	31	days.
2d	"	February,	"	28	" { Except in Leap-year, when it has 29.
3d	"	March,	"	31	"
4th	"	April,	"	30	"
5th	"	May,	"	31	"
6th	"	June,	"	30	"
7th	"	July,	"	31	"
8th	"	August,	"	31	"
9th	"	September,	"	30	"
10th	"	October,	"	31	"
11th	"	November,	"	30	"
12th	"	December,	"	31	"
				365	days.

B. — March, April, and May, are the months of Spring; June, July, and August, are the months of Summer; September, October, and November, are the months of Autumn; and December, January, and February, are the Winter months.

The following lines will enable the pupil to remember the number of days in each month.

"Thirty days hath September,
April, June, and November;
All the rest have thirty-one,
Excepting February all alone,
Which hath twenty-eight in fine,
Except in leap-year twenty-nine."

C.— As there are 365 days 6 hours in a year, in four years there will be 24 hours, or one day, overplus. This one day is added to February, which gives that month 29 days once in four years. This year is called bissextile, or leap-year, and has 366 days.

1. How many weeks in 1 month? How many in 2 months? In 4 months? In 8 months? In 9 months? In 10 months? In 12 months?
2. How many days in a week? In 2 weeks? In 4 weeks? In 6 weeks? In 3 weeks? In 12 weeks?
3. How many days in 7 weeks? In 8 weeks? In 10 weeks? In 9 weeks? In 5 weeks? In 11 weeks?
4. In 14 days how many weeks? In 21 days? In 42 days? In 49 days? In 63 days? In 84 days?
5. How many months in 12 weeks? In 16 weeks? In 24 weeks? In 36 weeks? In 48 weeks? In 96 weeks? In 132 weeks?
6. How many of the months have 31 days? Which are they?
7. How many of the months have 30 days? Which are they?
8. How many days has leap-year?
9. Why has leap-year more days than other years?
10. What month has 28 days? When has it 29 days?
11. If a man travel 9 miles in 18 hours, how far would he travel in 1 hour? In 7 hours? In 10 hours? In 12 hours? In 14 hours? In 20 hours?
12. How many days in 1 year?
13. How many months in 1 year? In 2 years? In 4 years? 8 years?
14. How many weeks in 1 year? In 2 years?
15. If a man receive 7 dollars per week, how much would he receive in 1 year?
16. *If you* read 5 pages in 1 day, how many pages *will you* read in 4 months?

LESSON LXII.

Table of Circular Motion.

60 Seconds	make	1 Minute, . . .	marked	′.
60 Minutes	"	1 Degree, . . .	"	°.
30 Degrees	"	1 Sign, . . .	"	s.

12 Signs, or 360 Degrees, the whole great Circle of the Zodiac.

1. How many seconds in 2 minutes? In 3 minutes? In 4 minutes? In 6 minutes?
2. How many seconds in 3 minutes and 1 second?
3. How many degrees in 2 signs? In 3 signs?
4. How many signs in 30 degrees? In 60 degrees? In 100 degrees? In 120 degrees?

LESSON LXIII.

Paper.

A. — Paper, when bought, is usually folded into two leaves, and is called a *folio*.

24 Sheets	of	paper	make	1	Quire.
20 Quires	"	"	"	1	Ream.
2 Reams	"	"	"	1	Bundle.
5 Bundles	"	"	"	1	Bale

B. — The number of leaves into which a sheet of paper is folded is designated by the following terms, which are used to denote the size of books.

A sheet of paper folded in two leaves is called a *folio*.

A sheet folded in four leaves is called a *quarto*, or 4to.

A sheet folded in eight leaves is called an *octavo*, or 8vo.

A sheet folded in twelve leaves is called a *duodecimo*, or *12mo.*

A sheet folded in eighteen leaves is called an 18mo.

A sheet folded in twenty-four leaves is called a 24mo.

1. How many sheets of paper in 2 quires? In 3 quires? In 4 quires? In 5 quires? In 6 quires? In 8 quires?

2. In 48 sheets how many quires? In 96 sheets? In 72 sheets? In 120 sheets?

3. How many quires in 1 ream? In 2 reams? In 4 reams? In 6 reams? In 3 reams?

4. How many sheets of paper in 1 ream?

5. How many reams in 4 bundles? In 6? In 8? In 10? In 12? In 14?

6. What cost 4 bundles of paper at 5 dollars a ream? What cost 7 bundles?

7. How many bundles in 4 bales? In 6 bales? In 7? In 8? In 9? In 10?

8. What cost 2 quires of paper at 1 cent a sheet? What cost $3\frac{1}{4}$ quires?

9. What cost 6 reams of paper at 7 dollars a ream? What cost 12 reams at $3\frac{1}{2}$ dollars a ream?

10. How many reams of paper in 4 bales? In 6 bales?

11. How many leaves are there in 2 sheets, folio? In 3 sheets? In 6 sheets?

12. How many leaves in 4 sheets, 4to?

13. How many leaves in a book containing 6 sheets, 12mo?

14. How many pages in a book of 10 sheets, 18mo? How many in a book of 12 sheets, duodecimo?

15. What cost 4 quires of paper at $\frac{1}{2}$ a cent a sheet? At $12\frac{1}{2}$ cents per quire?

16. Sold 4 reams of paper at $\frac{1}{2}$ of a dollar per quire; how much did I receive?

17. If you read 12 pages a day, how long will it take you to read a book of 10 sheets, 12mo?

18. How many columns are there in a folio newspa, each page containing 6 columns?

19. How many columns in a quarto sheet, each page containing 8 columns?

LESSON LXIV.

Miscellaneous Table.

12	Units, or single things,	make	1 Dozen.
12	Dozen, or 144, ...	"	1 Gross.
12	Gross	"	1 Great Gross.
20	Units or things . . .	"	1 Score.
56	Pounds	"	1 Firkin of butter.
196	Pounds	"	1 Barrel of flour.
200	Pounds	"	1 Barrel of pork.
200	Pounds	"	1 Barrel of beef.
14	Pounds of lead or iron	"	1 Stone.
21½	Stone	"	1 Pig.
70	Pounds	"	1 Bushel of salt.
60	Pounds	"	1 Bushel of wheat.
46	Pounds	"	1 Bushel of barley o
56	Pounds	"	1 Bushel of Indian
30	Pounds	"	1 Bushel of oats.

1. How many single things in 4 dozen?
2. What cost 4 dozen peaches at 1 cent each?
3. What cost 3 score of apples at 1 cent apiec
4. What cost 1 firkin of butter at 10 cents a p
5. What cost 1 barrel of flour at 4 cents a pou
6. How many pounds of salt in 2 bushels?
7. How many pounds of wheat in 3 bushels?
8. How many pounds of oats in 4 bushels?
9. If a horse eat 2 pounds of oats in one da long would a bushel last him?
10. If a family consume 2 pounds of buckwhea day, how long would a bushel last them?
11. What is the difference between a half a dozen, and 6 dozen dozen?
12. What cost 4 dozen peaches, at ½ a cent api
13. Gave 12 cents apiece for 4 doz. books; how *did they cost?*
14. *Bought* 4 firkins of butter at $7½ per firkin *much did I pay?*

LESSON LXV.

A. — The following tables will present to the pupil the fractional parts of the dollar, used in business.

$\frac{1}{2}$	of a dollar	is	equal	to	. . . .	50	cents.
$\frac{3}{4}$	of a dollar	"	"	"	. . . .	75	cents.
$\frac{1}{3}$	of a dollar	"	"	"	. . . .	$33\frac{1}{3}$	cents.
$\frac{1}{4}$	of a dollar	"	"	"	. . . .	25	cents.
$\frac{1}{5}$	of a dollar	"	"	"	. . . .	20	cents.
$\frac{1}{6}$	of a dollar	"	"	"	. . . .	$16\frac{2}{3}$	cents.
$\frac{1}{8}$	of a dollar	"	"	"	. . . .	$12\frac{1}{2}$	cents.
$\frac{1}{10}$	of a dollar	"	"	"	. . . .	10	cents.
$\frac{1}{12}$	of a dollar	"	"	"	. . . .	$8\frac{1}{3}$	cents.
$\frac{1}{16}$	of a dollar	"	"	"	. . . .	$6\frac{1}{4}$	cents.
$\frac{1}{20}$	of a dollar	"	"	"	. . . .	5	cents.

In New York Currency,

100	cents	is	equal	to	8 shillings;	equal	to	$1.
50	cents	"	"	"	4 shillings;	"	"	$\frac{1}{2}$.
$33\frac{1}{3}$	cents	"	"	"	2s. 8d.;	"	"	$\frac{1}{3}$.
25	cents	"	"	"	2 shillings;	"	"	$\frac{1}{4}$.
$16\frac{2}{3}$	cents	"	"	"	1s. 4d.;	"	"	$\frac{1}{6}$.
$12\frac{1}{2}$	cents	"	"	"	1 shilling;	"	"	$\frac{1}{8}$.
$6\frac{1}{4}$	cents	"	"	"	6 pence;	"	"	$\frac{1}{16}$.

In New England Currency,

100	cents	is	equal	to	6 shillings;	equal	to	$1.
75	cents	"	"	"	4s. 6d.;	"	"	$\frac{3}{4}$.
50	cents	"	"	"	3 shillings;	"	"	$\frac{1}{2}$.
$33\frac{1}{3}$	cents	"	"	"	2 shillings;	"	"	$\frac{1}{3}$.
25	cents	"	"	"	1s. 6d.;	"	"	$\frac{1}{4}$.
$16\frac{2}{3}$	cents	"	"	"	1 shilling;	"	"	$\frac{1}{6}$.
$12\frac{1}{2}$	cents	"	"	"	9 pence;	"	"	$\frac{1}{8}$.
$8\frac{1}{3}$	cents	"	"	"	6 pence;	"	"	$\frac{1}{12}$.
$6\frac{1}{4}$	cents	"	"	"	4 pence halfpenny,	"	"	$\frac{1}{16}$.

LESSON LXVI.

MISCELLANEOUS EXERCISES IN THE TABLES OF MONEY, WEIGHTS, AND MEASURES.

1. How many farthings make a penny?
2. Then, 1 farthing is what *part* of a penny?
3. 2 farthings is what part of a penny?
4. 3 farthings is what part of a penny?
5. How many pence in 1 shilling?
6. Then, 1 penny is what part of a shilling?
7. What part of a shilling is 2 pence?
8. What part of a shilling is 4 pence?
9. What part of a shilling is 6 pence?
10. What part of a shilling is 7 pence?
11. What part of a shilling is 10 pence?
12. What part of a shilling is 11 pence?
13. How many cents make a dime?
14. What part of a dime is 1 cent? 2 cents? 3 cents? 4 cents? 5 cents? 6 cents? 7 cents?
15. What part of a dollar is 1 dime? 2 dimes? 3 dimes? 6 dimes? 8 dimes?
16. What part of a pound is 1 shilling? 2 shillings? 3 shillings? 4 shillings? 6 shillings? 8 shillings? 9 shillings?
17. In one pound how many pence?

A. — When we change numbers of one name, or denomination, into another, we call the process *reducing* them.

18. Reduce 2s. 6d. to pence.
19. Reduce £2. 6s. to shillings.
20. Reduce 10s. 4d. to pence.
21. *Change* 6 dimes, 6 cents, to cents.
22. *Reduce* 12 feet, 6 in., to inches.
23. *In 1 yard* how many nails?

21. In 4 yards how many nails?
25. Reduce 4 yards, 2 nails, to nails.
26. How many quarters make a yard?
27. How many yards in 8 quarters?
28. How many yards in 12 quarters?
29. What cost 4 yards of cloth at 2 dollars a quarter?
30. How many ounces, avoirdupois, make a pound?
31. What part of a pound is 1 oz.? 2 oz.? 3 oz.? 4 oz.? 5 oz.? 7 oz.? 10 oz.? 12 oz.? 14 oz.?
32. How many quarters in 1 cwt.? In 2 cwt.? In 3 cwt.? In 4 cwt.? In 9 cwt.? In 10 cwt.?
33. How many qrs. in 4 cwt. 2 qrs.?
34. What cost 2 cwt. 3 qrs. of hay, at 2 cents per qr.?
35. What part of a day is 1 hour? 2 hours? 3 hours? 4 hours? 5 hours? 7 hours?

B. — The fraction should be reduced to the lowest terms.

36. What part of a month is 1 day?

C. — 30 days are usually reckoned for a month, although not always strictly accurate.

37. What part of a month is 2 days? 4 days? 5 days? 7 days? 8 days? 9 days?
38. One month is what part of a year? 2 months? 4 months? 6 months? 8 months?
39. What part of a week is 1 day? 2 days? 3 days? 4 days? 5 days? 6 days?
40. One week is what part of a month? 2 weeks? 3 weeks?
41. What part of a foot is 6 inches? 7 inches? 8 inches? 9 inches? 10 inches?
42. 1 furlong is what part of a mile? 2 furlongs? 4 furlongs?
43. How many furlongs in 7 miles? 8 miles? 9 *miles?* 10 miles? 11 miles? 12 miles?
44. How many miles in 20 furlongs?

D. — The answer should be given in miles and furlongs.

45. How many miles in 25 furlongs? In 30? In 35? In 42? In 50? In 60? In 74?

INTEREST.

LESSON LXVII.

A. — INTEREST is the compensation which the borrower of money makes to the lender. The money lent is called the *Principal*, and the sum allowed annually is called the rate *per cent.* — denoting the number of $\frac{1}{100}$ allowed on the principal. By 6 per cent. is meant $\frac{6}{100}$ of the sum lent; 7 per cent., $\frac{7}{100}$ of the sum lent. By Amount, is meant the interest and principal added together. Thus, if the interest of 100 dollars for a certain time is 10 dollars, the amount to be paid would be 110 dollars.

1. If the interest of 1 dollar is 6 cents for 1 year, what is the interest of 4 dollars for 1 year? Of 5 dollars? 7 dollars? 8 dollars? 9 dollars? 10 dollars? 50 dollars? 100 dollars?

2. What is the interest of 1 dollar for 1 year, at 6 per cent.? What would it be for 2 years? For 3 years? For 4 years? For 10 years?

3. What is the interest of 4 dollars for 2 years, at 6 per cent.? Of 6 dollars? Of 8 dollars? Of 10 dollars? Of 12 dollars? Of 20 dollars?

4. What is the interest of 50 dollars for 1 year, at 6 per cent.? For 4 years? For 7 years? For 9 years?

5. *What is* the interest of 100 dollars for 1 year, at *6 per cent.?* At 7 per cent.? At 8 per cent.? At 4 *per cent.?* At 5 per cent.?

6. What is the interest of 100 dollars for 5 years, at 6 per cent.? 6 years? 7 years?

7. What is the interest of 100 and 50 dollars for 1 year? For 2 years? For 3 years? For 4 years? For 5 years?

8. What is the interest of 400 dollars for 4 years, at 7 per cent.? 200 dollars?

B. — In computing interest, we reckon 30 days to the month, and 12 months to the year. Therefore, a day is $\frac{1}{30}$ of a month, and a month $\frac{1}{12}$ of a year. Thus, if the interest of 1 dollar for 1 year is 6 cents, the interest for one month would be $\frac{1}{12}$ of 6 cents; and $\frac{1}{12}$ of 6 is $\frac{6}{12}$ of 1, or $\frac{6}{12}$, which is equal to $\frac{1}{2}$; therefore, the interest for one month is $\frac{1}{2}$ of a cent. 4 months would be $\frac{4}{12}$, or $\frac{2}{3}$ of a year, &c.

9. What is the interest of 100 dollars, for 4 months, at 6 per cent.? For 5 months? For 6 months? For 8 months? For 10 months?

10. What is the interest of 50 dollars, for 4 years and 6 months, at 7 per cent.?

11. What is the interest of 100 and 50 dollars, for 6 years and 7 months, at 6 per cent.?

12. What is the interest of 400 dollars, for 3 years and 2 months, at 5 per cent.?

13. What is the interest of 1 dollar, for 1 month, or 30 days, at 6 per cent.? For 60 days? For 120 days? For 20 days? For 40 days?

14. What is the interest of 40 dollars, for 4 years, 4 months, and 20 days, at 6 per cent.?

15. What is the interest of 400 dollars, for 6 years, 2 months, and 10 days, at 2 per cent.?

16. What is the interest of 100 dollars, for 3 years, 4 months, at 7 per cent.?

17. *What* is the interest of 125 dollars, for 4 years, *2 months*, 10 days, at 7 per cent.?

LESSON LXVIII.

1. WHAT is the interest of $40 for 4 years, at 6 per cent.? At 2 per cent.? 4 per cent.?
2. What is the interest of $12 for 3 years, at 7 per cent.? At 5 per cent.?
3. What is the interest of $25 for 2 years, 2 months, at 2 per cent.?
4. What is the interest of $30 for 6 years, at 5 per cent.? At 7 per cent.?
5. What is the interest of $10 for 4 years, at 7 per cent.? At 8 per cent.?
6. What is the interest of $70 for 6 years, at 7 per cent.?
7. What is the interest of $100 for 3 years, 4 months, at 7 per cent.?
8. What is the interest of $8 for 8 years, 8 months, 8 days, at 8 per cent.?
9. What is the interest of $25 for 6 years, 1 month, at 6 per cent.?
10. What is the interest of $10 for 4 years, 2 months, at 7 per cent.?
11. What is the interest of $15 for 6 years, 4 months, 2 days, at 8 per cent.?
12. What is the interest of $80 for 3 years, 4 months, at 7 per cent.?
13. What is the interest of $100 for 1 year, 1 month, 1 day, at 1 per cent.?
14. What is the interest of $40 for 4 years, at 4 per cent.?
15. What is the interest of $120 for 2 years, 2 months, at 7 per cent.?
16. What is the interest of $40 for 4 years, 9 months, *12 days, at 7 per cent.?*
17. *What is* the interest of $124 for 7 years, at 7 per *cent.?*

LESSON LXIX.

1. WHAT is the amount of $40 for 2 years, at 6 per cent. ?

2. What is the amount of $60 for 4 years, at 4 per cent. ?

3. What is the amount of $80 for 3 years, at 5 per cent. ?

4. What is the amount of $100 for 6 years, at 4 per cent. ?

5. What is the amount of $125 for 2 years, at 7 per cent. ?

6. What is the amount of $150 for 4 years, 1 month, at 7 per cent. ?

7. Required the amount of $200 for 2 years, 2 months, at 4 per cent.

8. Required the amount of $145 for 6 years, 3 months, at 8 per cent.

9. Required the amount of $400, at 3 per cent., for 2 years, 2 months, 20 days.

10. What is the amount of $140 for 5 years, 4 months, 10 days, at 7 per cent. ?

11. What is the amount of $200 for 2 years, 6 months, 14 days, at 6 per cent. ?

12. Bought a horse for $50, and sold him so as to gain 2 per cent. on my purchase; for how much did I sell him?

13. A boy having 40 cents, lost 2 per cent. of them; how many had he left ?

14. A farmer had 100 bushels of corn, but found that 2 per cent. of it was damaged; how many bushels remained uninjured ?

15. A cistern contained 200 gallons, but 4 per cent. having leaked out, how many gallons remained ?

16. A certain village contained 400 inhabitants, but *during* a fatal epidemic 5 per cent. of them died; how *many* remained ?

LESSON LXX.

1. If the interest of $300 for two years is $48, what is the rate per cent.?

A. — The interest of 300 dollars for 2 years, at 1 per cent., is $6; and if $6 is 1 per cent., $48 will be as many per cent. as the number of times that $6 is contained in $48, which gives 8 per cent. for the answer.

2. If the interest of $200 for 2 years is $12, what is the rate per cent.?
3. If the interest of $400 for 3 years is $24, what is the rate per cent.?
4. If the interest of $50 for 1 year, 3 months, is $3, what is the rate per cent.?
5. If the interest of $75 for 4 years, 2 months, is $12, what is the rate per cent.?
6. A man paid $8 for the use of $48 for 1 year, 4 months; what was the rate per cent.?
7. A note of $100, being on interest 2 years, 2 months, amounted to $125; what was the rate per cent.?
8. A gentleman lent $60 for 1 year, 6 months, and received $90; what was the rate per cent.?

LESSON LXXI.

1. If the interest of $50 at 6 per cent. is $6, how long was it on interest?

A. — The interest of $50 for 1 year is $3. Now, if it require 1 year for the given principal to gain $3, it *will require as many* years to gain $6 as the number of *times that $3 is* contained in $6, which gives 2 years for *the answer.*

2. If the interest of $60 at 2 per cent. is $12, how long was it on interest?

3. How long must $100 be on interest at 4 per cent., to gain $40?

4. A note of $80, being on interest at 8 per cent., amounted to $160; how long was it on interest?

5. How long must $10 be on interest at 5 per cent., to gain $3?

6. If the interest of $20 at 4 per cent. is $4, how long a time was it on interest?

7. If the interest of $50 at 8 per cent. is $12, how long was it on interest?

8. Required the time that $40 must be on interest at 2 per cent., to gain $8.

9. A gentleman lent $60 at 6 per cent., and received $140; how long was it on interest?

LESSON LXXII.

1. WHAT principal at 10 per cent. is sufficient in 4 years to gain $6?

A. — The interest of $1 for 4 years is 40 cents. If, then, it requires 4 years for a principal of $1 to gain 40 cents, it will require a principal of as many dollars, to gain $6, as the number of times that 40 cents are contained in $6 (600 cents), which is $15, for the answer.

2. What principal, at 4 per cent., is sufficient in 2 years to gain $8?

3. What is the principal which in 4 years, at 3 per cent., will gain $4?

4. *What principal, at 6 per cent., is sufficient in 5 years to gain* $10?

5. What principal is sufficient in 2 years, at 8 per cent., to amount to $100?

6. What principal is sufficient in 2 years, 4 months, at 4 per cent., to amount to $64?

7. What principal is sufficient in 6 years, at 1 per cent., to gain $20?

8. What principal is sufficient in 7 years to gain $18, at 7 per cent.?

9. A note on interest 4 years, 2 months, at 4 per cent., amounted to $60; what was the principal?

LESSON LXXIII.

MISCELLANEOUS EXERCISES.

1. If a man earn 3$\frac{1}{2}$ dollars in one day, how much will he earn in 6 days? How much in 7 days? In 8 days?

2. If 2 men can do a piece of work in 4 days, how many men will it take to do a piece of work 6 times as large in the same time?

3. If 6 men can do a piece of work in 7 days, how long will it take 12 men to do a piece of work twice as large?

4. A can mow a field in 5 days, and B can mow it in 6 days; what part can each mow in one day? How long would it take both to mow it?

5. James can run 60 rods in a minute, and John can run only $\frac{2}{3}$ as far; how long will it take John to run the

7. A teacher being asked how many scholars he had, answered that 20 of them were girls, and $\frac{2}{5}$ of them boys; how many boys were there? How many scholars belonging to the school?

8. Four men started on an exploring expedition, with provisions enough to last them 6 months; but before they had eaten any, 2 other men joined them, with provisions enough to last them 8 months; they agreed to put their provisions together and share equally; how long would their provisions last them?

9. Dick and Harry started to run a race of 40 rods. While Harry was running 10 rods, Dick gained on him $\frac{1}{2}$ of the distance, but in the next 10 rods Dick stumbled, and lost $\frac{1}{5}$ of the distance, and during the rest of the distance their speed was equal. How far was Harry behind Dick, at the end of the race?

10. Two boys, Peter and Charles, were *guessing* the height of a certain tree; Peter guessed it was 50 feet high, and Charles guessed it was 40 feet; but upon measuring it, after it was cut down, it was found that Peter had guessed $\frac{1}{10}$ too much, and Charles $\frac{1}{8}$ too little; how high was the tree?

11. Russell alone can row a boat 6 miles an hour, but with the assistance of Blodgett he can row it 9 miles an hour; how far could Blodgett alone row the boat in one hour?

12. There is a pole 12 feet in the ground, and $\frac{1}{5}$ in the air; how long is the pole?

13. Two men start from New York, and travel in opposite directions, one at the rate of $4\frac{1}{4}$ miles an hour, and the other at the rate of $6\frac{3}{4}$ miles an hour; how far apart will they be at the end of 1 hour? How far in 4 hours? 6 hours? 10 hours?

14. Three men hired a pasture for 60 dollars. A put in 4 oxen, B 3 oxen, and C 5 oxen; how much ought *each to pay?*

15. *If* Jones can dig a well in 4 days, and Smith in 6

days, what part can they both dig in one day? How long would it take both to dig it?

16. If a post 8 feet high cast a shadow of 6 feet at a certain time of day, what is the height of a steeple whose shadow is 60 feet, at the same time of day?

17. Four men can build a wall in 12 days, but, having received an addition to their number, they found they could accomplish it in 8 days; how many men were added, supposing their capacity for labor equal to the others?

18. A man, failing in trade, could pay only 25 cents on a dollar; how much could he pay on 1000 dollars?

LESSON LXXIV.

1. If the interest of $100 for 2 months at 6 per cent. is $1, what is the interest for 1 month?

2. If the interest of $100 for 1 day is $1\frac{1}{2}$ cents, what is the interest for 2 days? For 4 days? For 7 days? For 8 days? For 10 days? For 12 days?

3. If $100 gain $6 in 12 months, what will $400 gain in 4 months?

A. — If $100 gain $6 in 12 months, $400 will gain 4 times as much, — that is, $24, — in the same time; and if $400 gain $24 in 12 months, in 4 months it will gain $\frac{1}{3}$ of $24, that is, $8; because 4 months is $\frac{1}{3}$ of 12 months.

4. If $100 gain $6 in 12 months, what will $600 gain in 1 month? In 2 months? In 3 months? In 4 months?

5. If $400 gain $8 in 4 months, what will $100 gain in 12 months, or what will be the per cent.?

6. *If $300 gain $12 in 8 months, how long would it require $100 to gain $6?*

7. If $300 gain $12 in 8 months, what sum would it require to gain $8 in 2 months?

8. If $100 gain $6 in 12 months, how many months would it require for $400 to gain $10?

9. If 40 bushels of oats are sufficient for 5 horses 6 weeks, how many bushels would it require to supply 15 horses 8 weeks?

10. If 20 oxen eat 4 tons of hay in 30 days, how many oxen would it take to eat 12 tons in 60 days? In 50 days? In 70 days? In 80 days?

11. If 7 men can build 8 rods of wall in 4 days, how many days would it take 14 men to build 32 rods of wall? 40 rods? 80 rods?

12. If 12 men can reap a field of 4 acres in 8 days, by laboring 6 hours a day, how many acres would 6 men reap in 12 days, by laboring 9 hours per day?

13. If 6 dollars' worth of provisions will last 5 men 7 days, how long will it last 10 men?

14. If 8 bushels of grain will last 7 horses 5 days, how long will 16 bushels last 4 horses?

15. A gentleman wished to give 100 dollars for benevolent objects. Having given away $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$, he divided the rest equally among 6 poor widows; how much did each widow receive?

16. Turner's boat, in making 4 "tacks," can gain 40 rods; but an inexperienced helmsman, in bringing the "boat about," lost in every tack $\frac{1}{5}$ of the distance he had made. At this rate, how many times must he "tack" to gain the 40 rods?

17. The steamer C. B. Stevens can run 10 miles in an hour; but in running 18 miles, down the river Merrimack, it is assisted by the current $\frac{1}{8}$ in speed, and in returning is impeded in speed $\frac{1}{9}$. How long will it take her to run each "trip"? How long will it take her to run both "trips"?

18. *Four men* engaged in trade, and put in money as *follows:* A put in 6 dollars, B 8 dollars, C 12 dollars,

and D 10 dollars; they gained 100 dollars; what was each man's share of the gain?

19. Two men, Smith and Brown, hired a pasture; Smith put in 4 cows for 3 months, and Brown put in 6 cows for 4 months. They paid 48 dollars; how much ought each to pay?

B. — Four cows for 3 months is the same as 12 cows for one month; and 6 cows for 4 months is the same as 24 cows for one month. Therefore, the question is the same as if Smith put in 12 cows, and Brown 24 cows.

20. A and B commenced trade together; A put in 4 dollars for 2 months, and B 2 dollars for 4 months; they gained 40 dollars; how much was each man's share?

21. Three men, A, B and C, engaged in trade, and put in money as follows: A put in 6 dollars as often as B put in 4, and as often as C put in 3. A's money was in 2 months, B's 3 months, and C's 2 months, and they gained 80 dollars; required the share of each?

22. Three men commenced trading in company, under the firm of Jones, Brown and Poor. Jones put in 2 dollars as often as Brown put in 3, and as often as Poor put in 6. Brown's money was in twice as long as Jones', and Jones' twice as long as Poor's; they gained 110 dollars; what was the share of each?

C. — Brown's money was in 4 times as long as Poor's; the same as if Brown's was in 4 months, Jones' 2 months, and Poor's 1 month.

LESSON LXXV.

1. CHARLES being asked the cost of his watch, replied *that his watch* and key cost 14 dollars, but the watch cost *6 times as much* as the key; what cost the key? How *much was the* watch worth?

2. Peter Lovegame spends $\frac{1}{3}$ of his time in smoking, $\frac{1}{4}$ in "gunning," 2 hours in *loafing*, and 6 hours in eating, drinking, and sleeping; how many hours out of the 24 remain for useful purposes?

3. If 3 pounds of beef cost 18 cents, what cost 20 pounds? 12 pounds? 10 pounds?

4. A man has 2 horses and a saddle. The saddle (which is worth 24 dollars), when put upon one horse, is worth 3 times as much as the horse, but when put upon the other horse, it is worth $\frac{1}{6}$ as much as the horse; what is the worth of each horse? What is the worth of each horse with the saddle?

5. The head of a certain fish is 9 inches long, the tail is as long as the head and $\frac{1}{2}$ of the body, and the body is as long as the head and tail both; what is the length of the fish?

6. A man having returned from California, being asked how much money he had made, answered, that if he had made as much more, and half as much more, he should have 1000 dollars; how much had he made?

7. "A man, on his way to market, was met by another man, who said, 'Good-morrow, sir, with your hundred geese.' Said he, 'I have not a hundred, but if I had $\frac{1}{2}$ as many more and $2\frac{1}{2}$ geese, I should have a hundred.' How many had he?"

8. What is that number to which if its $\frac{1}{2}$ and $\frac{1}{4}$ be added, the sum will be 100?

9. A lady being asked how old she was, answered, that if $\frac{1}{3}$ and $\frac{1}{8}$ were added to her age, it would be 99 years; what was her age?

10. What number is that to which if its $\frac{3}{5}$ be added, the number will be 48?

11. If $\frac{1}{4}$ of a flag-staff is above the surface and 8 feet beneath the surface of the ground, what is the whole length of the staff?

12. *If $\frac{1}{4}$ of a grain of morphine be divided into 3 powders, what part of a grain would each contain?*

13. I have an orchard, in which $\frac{1}{6}$ of the trees bear peaches, $\frac{2}{5}$ bear apples, $\frac{1}{12}$ of them bear pears, 4 bear cherries, and 10 bear plums; how many trees are there in the orchard, and how many of each sort?

14. A, B and C, started on a journey of 42 miles. A travelled $\frac{1}{7}$ of the distance in an hour, B $\frac{2}{7}$ in an hour, and C $\frac{3}{7}$ in an hour; how many miles had each travelled in an hour? How many miles had each then to travel? How far was A from C, at the end of the hour? How long did it take each to travel the whole distance?

15. A lady bought 3 pieces of velvet for $20. The first piece cost $4, and the first and second pieces cost 6 times as much as the third piece; what was the cost of each piece?

16. A boy bought some apples, peaches and pears. The apples cost 12 cents; the apples and peaches cost 3 times as much as the pears, and the peaches and pears cost twice as much as the apples; how much did he pay for the peaches? How much for the pears?

17. A merchant sold some flour, some grain, and some cotton. For the flour he received $100; for the flour and grain he received 5 times as much as for the cotton, and for the grain and cotton he received 4 times as much as for the flour; how much did he receive for the grain, and how much for the cotton?

18. A market-woman sold some butter, some eggs, and some milk. For the eggs and milk she received $4, which was $\frac{2}{5}$ of what she received for the butter; how much did she receive for the butter?

19. Farmer Smith's horse is worth $120, which is $\frac{4}{5}$ of the worth of his cows and pigs; and his horse and cows are worth 3 times as much as the pigs; how much are the cows and pigs worth?

20. A merchant owned a ship, a brig, and a sloop. *The ship was* worth $10,000; the ship and brig were *worth 5 times as* much as the sloop, and the brig and

sloop were worth $\frac{1}{2}$ as much as the ship; what was the worth of the brig and of the sloop?

21. My house is worth $4000; my barn is worth $\frac{1}{8}$ as much as the house, and my garden is worth 4 times as much as the barn; what is the worth of the barn and of the garden?

LESSON LXXVI.

1. LENT my neighbor $300 for 4 months, which he duly paid; but some months afterward, I borrowed of him $100; how long shall I keep it to balance the favor?

2. A certain garrison has provision sufficient to last 100 men 8 months; how many men must be sent away, in order that the same provision may last them 10 months?

3. "As I was beating on the forest-grounds,
Up starts a hare before my two greyhounds.
The dogs, being light of foot, did fairly run,
Unto her fifteen rods, just twenty-one.
The distance that she started up before
Was fourscore sixteen rods just, and no more.
Now this I 'd have you unto me declare,
How far they ran before they caught the hare?"

4. How many barrels of flour at 7 dollars a barrel, must be given in exchange for 12 bushels of wheat at 3 dollars a bushel?

5. How many cords of wood at 5 dollars per cord, must be given in exchange for 12 yards of cloth at 10 dollars per yard?

6. Sold land at 20 dollars an acre; how many acres would it take to pay for 25 tons of coal at 4 dollars per *ton?*

7. *Bought* 6 yards of broadcloth at $4\frac{1}{4}$ dollars per

yard, and paid for it in apples at $\frac{1}{2}$ a dollar per bushel; how many bushels did it require to pay for the cloth?

8. How many firkins of butter, each containing 60 pounds, will it take to purchase 4 firkins, each containing 30 pounds?

9. A lady purchased 10 yards of silk at $1\frac{1}{4}$ dollars per yard; how many yards of calico, at $\frac{1}{4}$ of a dollar per yard, could she have bought for the same sum?

10. A gentleman gave $\frac{1}{4}$ of his estate to his son, $\frac{1}{5}$ of the remainder to his daughter, and the rest to his wife; the difference between the son and daughter's portion was $100; how much did his wife receive?

11. A man left $\frac{1}{3}$ of his estate to his wife, $\frac{1}{4}$ of the remainder to his son, and $\frac{1}{5}$ of the remainder, which was $100, to his daughter; how much of his estate was left to be divided among his other heirs?

12. A young man lost $\frac{1}{4}$ of his capital in trade, but afterward gained $100, which made his capital $1000; how much money did he lose?

13. Three men, A, B and C, are to share $400 in the proportion of $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$, respectively; but as C died, it is required to divide the whole sum properly between the other two; how much should each receive?

14. A father left his son a legacy, $\frac{1}{4}$ of which he spent in 6 months, and $\frac{3}{4}$ of the remainder lasted him 8 months longer, when he had only $100 remaining; what sum did his father leave him?

15. A cistern has 2 pipes. When the first alone is open, the cistern will be filled in 4 hours, and when the second alone is open, it will be filled in 8 hours; how much of the cistern will each pipe fill in an hour? How much will both fill in an hour? How many hours will it take both to fill it?

16. Henry can row a boat across the river in 5 minutes, and George can row it in 7 minutes; what part of the distance can each row in a minute? How long will it take both together to row the boat across?

17. Two men, living together, found that when both staid at home 4 dollars would last them a week, but when the first was away it would last the other man 3 weeks. What part did the first man alone spend in a week? What part did the second man spend in a week? How long would the 4 dollars last the first man alone?

18. A cistern has 4 pipes. The first will fill it in 2 hours, the second will fill it in 3 hours, the third in 4 hours, and the fourth will empty it in 2 hours. Now, if the pipes are all open at the same time, how long will it take to fill the cistern?

19. A boy had 20 cents to spend for apples and peaches; for every apple he gave 2 cents, and for every peach 3 cents; he bought an equal number of each; how many did he buy?

20. If 4 pounds of flour will make 40 four-cent loaves of bread, how many six-cent loaves can be made from the same quantity?

21. A man, in distributing some money among several indigent persons, gave $2\frac{1}{2}$ dollars to one man, $3\frac{1}{3}$ dollars to another, $4\frac{3}{4}$ dollars to another, $5\frac{1}{8}$ dollars to another, and $1\frac{3}{8}$ dollars to another; how many dollars did he give away?

22. A student, having a Bible, a dictionary and an algebra upon his table, was asked the price of each. He answered, that his Bible cost twice as much as his dictionary, and the dictionary cost twice as much as the algebra, and that the three books cost 30 dollars; what was the cost of each book?

23. My neighbor has a fine orchard of fruit-trees, $\frac{1}{8}$ of them bearing peaches, $\frac{1}{4}$ bearing pears, $\frac{1}{8}$ bearing apples, 6 bearing cherries, and 4 bearing damsons; how many trees has he in the orchard? How many of each kind?

24. A boy, being asked how many cents he had for Christmas, replied, that $\frac{2}{3}$ of the number was 6 more *than* $\frac{1}{4}$ *of the* number; how many cents had he?

25. A lady, having several peaches, gave away $\frac{1}{2}$ of

them, and $\frac{2}{3}$ of the remainder, and then had 12 left; how many had she at first?

26. A man being asked the price of his farm, replied that his woodland was worth 1000 dollars, and $\frac{2}{5}$ of the value of the woodland was equal to $\frac{3}{4}$ of the value of the rest of the farm; what was the farm worth?

27. The ship "Plymouth Rock" was sailing at the rate of 12 *knots* an hour, but having "sprung her mast," it was observed that her speed was impeded $\frac{1}{6}$ in every knot she *made;* how long, at that rate, would it take her to sail 100 *knots*, or miles?

28. A person being asked what time it was, answered, that the time past noon was $\frac{1}{4}$ of the time past midnight; what time was it?

A. — The time past noon is $\frac{1}{4}$ of the time past midnight. Hence, the time from midnight to noon — 12 hours — will be $\frac{3}{4}$ of the time past midnight.

29. A man being asked the time of day, replied, that $\frac{1}{3}$ of the time past noon was equal to $\frac{1}{6}$ of the time to midnight; what was the hour?

30. A man being asked the time of day, answered, that the time past noon was equal to $\frac{3}{4}$ of the time to midnight; what was the time?

31. A gentleman has 2 horses, and a saddle worth 25 dollars. Now, if the saddle be put on the first horse, it will make his value double that of the second; and if the saddle be put upon the second horse, it will make his value triple that of the first. What is the value of each horse?

32. A and B together can do a certain work in 8 days, and with the assistance of C they can do it in 5 days; how much of it can A and B do in 1 day? How much of it can A, B and C, do in 1 day? How much of it can C *do alone in* 1 day? How long would it take C to do *it alone?*

WRITTEN ARITHMETIC.

NUMERATION.

LESSON I.

A. — Numeration is the art of expressing the value of numbers by words or characters.

B. — For convenience, the value of numbers is usually expressed by characters called Figures, of which there are ten, thus: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

The first nine of these figures are called *significant* figures, because they signify, or express, some number, when standing alone.

C. — The cipher (0) is called *insignificant*, because it signifies *nothing* when standing alone. But, when the cipher stands at the right hand of a significant figure, it increases the value of that figure ten times. Thus, 4, when standing alone, means simply four units; but, if we place a cipher at the right of it, — thus, 40, — we have forty units, or the number 40.

Note to the Teacher. — This should be fully illustrated on the black-board; the simple and local values of figures should also be explained.

D. — The following table will show the manner of *numerating:*

4	Units.
42	Tens.
422	Hundreds.
4646	Thousands.
47892	Tens of Thousands.
465321	Hundreds of Thousands.
4321764	Millions.

1. How many figures express Units? How many express Tens? Hundreds? Thousands? Tens of Thousands? Hundreds of Thousands? Millions?

LESSON II.

A. — NUMERATE the following numbers and read them, or write them in words on the slate.

1.	12	13.	9,898	25.	100,001
2.	42	14.	42,641	26.	100,101
3.	64	15.	36,000	27.	124,242
4.	125	16.	10,000	28.	464,464
5.	196	17.	12,000	29.	400,004
6.	107	18.	12,001	30.	700,700
7.	604	19.	42,001	31.	1,000,000
8.	540	20.	60,000	32.	1,000,001
9.	4,220	21.	64,010	33.	1,001,101
10.	6,000	22.	70,171	34.	4,040,404
11.	4,010	23.	90,142	35.	8,080,707
12.	3,707	24.	100,000	36.	9,000,000

B. — Express the following words in figures, on the slate:

1. Forty-five. One hundred and twenty-five. Four hundred and one. Five hundred and fifty-five. One thousand. One thousand and one. Four thousand two hundred and twenty-four. Seven thousand eight hundred and ninety-six. Ten thousand. Ten thousand and one. Twelve thousand and one hundred. Forty thousand. Forty thousand and seventy. Seventy-five thousand. Eighty thousand and fifty.

2. *One* hundred thousand. One hundred thousand *and six.* *Four* hundred thousand and seventy-two. *Six hundred* and forty-two thousand eight hundred and

sixty-one. One million. One million and seven. Two million four hundred and forty-six thousand five hundred and sixty-eight.

ADDITION.

LESSON III.

A. — To add numbers mechanically, or to perform addition by means of the slate:

I. Write the given numbers under each other, so that units may be under units, tens under tens, &c., and draw a line beneath them.

II. Then add together the figures in the column of units; and if their sum be less than ten, write it under the units' column, but if the sum be ten or more, write down the unit figure under the column of units, and add, or carry, the tens to the column of tens.

III. Then add together the figures in the column of tens, and proceed as in the column of units; and so continue until all the columns are added, writing down the total amount of the last column.

B. — The following example will illustrate the method of performing Addition:

Example.	Explanation.
948	In performing this operation, we first
123	add together the column of units, by
476	saying, 6 and 3 are 9, and 8 are 17.
Amount, 1547	In 17 there are 7 units, which we write under the column of units, and 1 ten, which we carry to the column of tens, saying, 1

and 7 are 8, and 2 are 10, and 4 are 14 (tens). The 4 (tens) we write under the column of tens, and the 1 (hundred) is carried to the column of hundreds; thus, 1 and 4 are 5, and 1 are 6, and 9 are 15 (hundreds), which we write down, and the work is finished.

PROOF. — Commence at the top of each column, and add the numbers *downward* in the same manner as they were added *upward*, and if the two sums are alike, the work is supposed to be correct.

LESSON IV.

A. — WRITE on the slate, and add together, the following numbers:

(1.) Nuts.	(2.) Apples.	(3.) Pens.	(4.) Balls.	(5.) Books.
125	242	441	321	468
144	242	224	134	864
123	412	123	424	648
392				

(6.) Pencils.	(7.) Cents.	(8.) Dollars.	(9.) Dimes.	(10.) Mills.
341	982	874	385	572
143	289	478	583	725
431	892	874	835	527
915				

(11.) Barrels.	(12.) Miles.	(13.) Inches.	(14.) Rods.	(15.) Feet.
1482	9876	4678	3456	2134
4704	7689	8764	6453	4321

(16.) Horses.	(17.) Sheep.	(18.) Cows.	(19.) Oxen.	(20.) Pigs.
6842	9864	8888	6666	3251
2142	4698	8888	7777	2789
1421	8946	8888	4444	8906

(21.) People.	(22.) Trees.	(23.) Houses.	(24.) Farms.
41642	68423	41414	37983
48641	38746	14141	95437
14247	54876	11444	69897

(25.) Ships.	(26.) Soldiers.	(27.) Bushels.	(28.) Boys.	(29.) Acorns.
123	464	987	869	657
321	876	987	573	569
456	594	456	978	213
672	632	654	579	935
728	417	987	253	875

(30.) Birds.	(31.) Tons.	(32.) Pounds.	(33.) Quarters.
1	3	8	7
12	13	88	76
142	133	888	357
1712	1333	8888	7325
14212	13333	88888	89056

(34.) Dozens.	(35.) Yards.	(36.) Feet.	(37.) Inches.	(38.) Ells.
12	18	24	30	36
13	19	25	31	37
14	20	26	32	38
15	21	27	33	39
16	22	28	34	40
17	23	29	35	41

(39.)	(40.)	(41.)	(42.)
4789	4648	9673	4007
8749	8464	3976	7400
9874	4864	6973	7040

(43.)	(44.)	(45.)	(46.)
6000	9001	78421	42424
0006	1009	12345	24242
6000	9010	54321	42242

(47.)	(48.)	(49.	(50.)
10000	44444	66666	77777
12000	44444	66666	77777
18000	44444	66666	77777

(51.)	(52.)	(53.)	(54.)
12345	40021	171717	34567
67890	12004	717171	76543
98765	42004	171717	34567
43212	14212	717171	76543

(55.)	(56.)	(57.)	(58.)
12	123	4442	36900
42	321	2002	20742
64	132	1762	90085
75	213	4176	05389
84	312	5412	91355
26	132	2761	10009
28	231	1761	95359
34	132	4242	71234
16	423	2424	23456
81	342	1682	34567
14	268	4234	45678
76	862	4247	56789

LESSON V.

1. ADD together the following numbers: 25, 28, 54, 68, 71, 46, 64, 79, 87, 94.
2. Add together the following numbers: 125, 101, 178, 400, 7, 14, 29, 84, 169.
3. Add together the following numbers: 4001, 871, 40, 101, 842, 601, 1423, 49.
4. Add together the following numbers: 1072, 984, 8765, 4002, 781, 40, 417, 64.
5. Add the following numbers: 19247, 86004, 178, 1, 8, 6471, 89741, 99438.
6. Add the following numbers: 684, 781, 496, 400, 876, 412, 874, 912, 404, 631, 412, 121, 184, 421, 700, 100, 388, 736.
7. Add the following numbers: 4, 14, 144, 1444, 14444, 144444, 1444444.
8. Add the following numbers: 1, 10, 100, 1000, 10000, 100000, 1000000.
9. Add the following numbers: 999999, 99999, 9999, 999, 99, 9, 99, 999, 9999, 99999, 999999, 9999999, 99999999.
10. Add the following numbers: 47894, 8765, 40, 47, 8972, 468, 21, 2, 24, 244, 25, 28, 46, 984.
11. Add the following numbers: 1458174, 426896, 98764, 6897, 478, 84, 7.

LESSON VI.

PRACTICAL EXERCISES.

1. A BUTCHER sold 475 pounds of beef to one man, 684 lbs. to another, 986 lbs. to another, and 748 lbs. to another man; how many pounds did he sell in all?
2. The Ohio river is 1350 miles long; the Tennessee

1100 miles; the Alabama, 650; the Savannah, 600; the Potomac, 550; the Connecticut, 410; and the Hudson, 324 miles long; what is the total length of these rivers?

3. Add together the length of the following rivers of Europe: The Rhine, 670 miles; Elbe, 570; Loire, 540; Vistula, 500; Tagus, 580; Rhone, 390; and the Po, 375 miles.

4. Find the aggregate height of the following mountains. Mont Blanc, 15,781 feet; Ætna, 10,963 feet; Parnassus, 8000 ft.; Snowdon, 3571 feet; and Mount Washington, 6428 ft.

5. In an orchard, 421 trees bear apples, 125 bear pears, 78 bear cherries, 69 bear peaches, and 84 bear plums; how many trees in the orchard?

6. My Bible contains 475 pages, my Dictionary contains 576 pages, my Geography, 476 pages, and my History, 965 pages; what is the whole number of pages?

7. Bought a house for 4758 dollars, a farm for 5429 dollars, a mill for 798 dollars, a carriage for 475 dollars, and a horse for 215 dollars; what was the cost of the whole?

SUBTRACTION.

LESSON VII.

A. — To perform Subtraction by means of the slate:

I. Write the less number under the greater, units under units, tens under tens, &c.

II. Then commence with the units, and take each *lower figure* from the one above it, and write the difference *beneath*.

III. But if any lower figure is larger than the one

above it, add 10 to the upper figure, then subtract, and carry 1 to the next lower figure before subtracting it.

IV. Thus proceed until all the figures are subtracted, and the result will be the difference, or remainder.

B. — In Subtraction, the number that we subtract *from* is called the Minuend, the number subtracted is called the Subtrahend, and the result of the subtraction is called the Remainder.

C. — The following example will illustrate the method of performing subtraction:

EXAMPLE.		EXPLANATION.
Minuend	424	In the first place, we say 2 units
Subtrahend	182	from 4 leave 2 units, which we
Remainder	242	write under the units. Then 8

from 2 we cannot take; we therefore add 10 to the 2, which makes it 12, and subtract the 8 from it, which leaves 4 (tens). This we write under the tens, and carry 1 (hundred) to the next lower figure and subtract as before, and the work is finished.

PROOF. — Add the remainder to the subtrahend, and if their sum be like the minuend, the work is right.

NOTE TO THE TEACHER. The principle of *carrying*, in Subtraction, should here be fully explained to the pupil. See COMMON SCHOOL ARITHMETIC, p. 31, Art. 30.

LESSON VIII.

EXERCISES FOR THE SLATE.

	(1.) Pears.	(2.) Apples.	(3.) Plums.	(4.) Grapes.
From	125	476	972	448
Take	124	125	684	426
	1	351	288	22

	(5.) Oranges.	(6.) Lemons.	(7.) Raisins.	(8.) Limes.
From	784	981	864	784
Take	635	764	648	487

	(9.) Rods.	(10.) Inches.	(11.) Feet.
From	4214	1000	9999
Take	4112	9	8888

	(12.) Cords.	(13.) Tons.	(14.) Hogsheads.
From	12345	10010	44444
Take	11234	2121	14848

	(15.) Miles.	(16.) Bushels.	(17.) Minutes.
From	478902	100000	876417
Take	187654	99999	123456

	(18.) Hours.	(19.) Days.	(20.) Weeks.
From	414141	787878	479888
Take	141414	787878	978978

	(21.) Seconds.	(22.) Dollars.	(23.) Shillings.
From	10101	244256	100000
Take	1010	9	1

	(24.) Pounds.	(25.) Cents.
From	400900439	980980982
Take	44444	1716470

LESSON IX.

1. SUBTRACT 444 from 728; 648 from 964; 343 from 848; 664 from 797; 864 from 989; 125 from 427; 44 from 682; 18 from 868; 496 from 628; 444 from 888; 17 from 98; 75 from 146.

2. From 1000, take 20; take 35; take 64; take 71; take 90; take 100; take 101; take 17; take 141; take 146; take 190; take 225; take 784; take 896; take 929; take 448; take 864.

3. From 1401, take 44; take 76; take 68; take 94; take 125; take 401; take 184; take 135; take 476; take 1010; take 968; take 489.

4. From 9842, take 178; take 624; take 46; take 10; take 478; take 324; take 375; take 422; take 976; take 1000; take 2000; take 3846.

5. From 1000, take 999; take 99; take 9; take 100; take 10; take 40; take 50; take 67; take 74; take 84; take 107; take 462; take 896.

6. From 1,000,000, take 478542; take 87642; take 4781; take 427; take 47; take 9; take 99; take 999; take 9999; take 777; take 888.

7. From 144, take 79. From 976 take 472. From 876 take 123. From 1001 take 101. From 42 take 25. From 18765 take 987.

8. From 8476 take 647. From 9846 take 375. From 68421 take 8765. From 98764 take 8764. From 89898 take 8989. From 44444 take 9999. From 879879 take 8787.

9. Subtract 987 from each of the following numbers: 9876. 4878. 9421. 6446. 3214. 8764. 999. 989. 4876. 6869. 1000. 101841. 4792.

10. Subtract 1000 from 8976; 1847 from 6842; 9478 from 10896; 444 from 888; 999 from 1000; *1000 from* 9999; 864 from 4976; 6781 from 8984; *486 from* 987; 9684 from 100001.

LESSON X.

PRACTICAL EXERCISES.

1. The Merrimac river is 200 miles long, and the Connecticut 410 miles long; how much longer is the Connecticut than the Merrimac?

2. A man was born A. D. 1779, and died A. D. 1851; how old was he when he died?

3. The State of Massachusetts contains 7800 square miles, and New Hampshire 9491 square miles; how many more square miles has New Hampshire than Massachusetts?

4. Sir Isaac Newton was born A. D. 1642, and died A. D. 1727; how old was he at the time of his death?

5. Gunpowder was invented in the year 1330; how long was this before the invention of printing, which was in the year 1441?

6. Christopher Columbus discovered America A. D. 1492; how long was this before the landing of the Pilgrims at Plymouth, A. D. 1620?

7. A wealthy gentleman, wishing to give 4684 dollars for charitable purposes, gave 786 dollars to the Humane Society, 425 dollars to the Orphans' Asylum, and the remainder to the Seaman's Friend Society. How much did the last receive?

8. A lady had 1876 dollars, and having spent a portion of it, found she had 498 dollars left; how much had she spent?

9. Three men, A, B and C, engaged in trade, with a capital of 10,000 dollars. A put in 4584 dollars, B put in 2571 dollars, and C put in the remainder; how much did C put in?

10. Two ships started from the same port, and sailed *the same direction*, but when the first ship had sailed 464 *miles, the other* had sailed 1004 miles; how far were the *ships then apart?*

MULTIPLICATION

LESSON XI.

A. — To perform Multiplication by means of the slate, when the multiplier is 12 or less:

I. Write down the multiplicand, or number to be multiplied, and set the multiplier under the unit figure of the multiplicand.

II. Then multiply each figure of the multiplicand by the multiplier, and carry for tens as in addition. The result of the multiplication is called the product.

B. — The following example will illustrate this method of multiplying:

EXAMPLE.		EXPLANATION.
Multiplicand	478	In this example, we say 8 times 8 are 64; we write the 4 (units) under the units, and carry the 6 (tens) to the place of tens, saying 8 times 7 are 56, and 6 are 62 (tens). The 2 (tens) is written under tens, and, carrying the 6 (hundreds) to the place of hundreds, we say 8 times 4 are 32 (hundreds), and 6 are 38, which we write down, and the work is finished.
Multiplier	8	
Product	3824	

PROOF. — Multiply the multiplier by the multiplicand, and if the two products agree, the work is supposed to be correct.

EXAMPLE.		EXPLANATION.
Multiplier	8	By this process, we are almost sure to detect any error that may have been made. Because, when two or more numbers are multiplied together, the result is the same, whatever may be the order of multiplying.
Multiplicand	478	
Product	3824	

LESSON XII.

EXERCISES FOR THE SLATE.

	(1.)	(2.)	(3.)	(4.)
Multiply	121	424	841	426
By	4	2	3	5
	484	848	2523	2130

	(5.)	(6.)	(7.)	(8.)
Multiply	128	427	1234	4281
By	6	5	4	3

	(9.)	(10.)	(11.)
Multiply	6842	47823	12345
By	5	6	7

	(12.)	(13.)	(14.)
Multiply	871421	141414	42424
By	8	9	10

	(15.)	(16.)	(17.)
Multiply	18234	123456	414343
By	11	5	4

	(18.)	(19.)
Multiply	9842178 97	82417654 8
By	6	7

20. Multiply 48 by 9; by 10; by 11; by 12.
21. Multiply 96 by 4; by 5; by 6; by 7.
22. Multiply 142 by 8; by 9; by 11; by 12.
23. Multiply 1894 by 6; by 7; by 8; by 9.
24. Multiply 4876 by 9; by 10; by 4; by 12.
25. *Multiply 14876* by 8; by 7; by 6; by 5
26. *Multiply 4687642* by 4; by 8; by 9; by 12.

LESSON XIII.

A. — When the multiplier is larger than 12:

I. Write the multiplier under the multiplicand, units under units, &c.

II. Then, commencing with the units, multiply each figure of the multiplicand by each figure of the multiplier, and arrange the products so that the first figure of each product may stand directly under its multiplier.

III. Then add these several products together, and their sum will be the true product.

(1.) EXAMPLE.			(2.) EXAMPLE.	
Multiplicand	1842		Multiplicand	1684
Multiplier	125		Multiplier	468
	9210	product of 5		13472
	3684	product of 2		10104
	1842	product of 1		6736
Total prod.	230250		Product	788112

LESSON XIV.

EXERCISES FOR THE SLATE.

Multiply	1234	Multiplicand.	4321
By	1234	Multiplier.	1234
	4936		17284
	3702		12963
	2468		8642
	1234		4321
Product	1522756	Product	5332114

(3.)

Multiply 234 Multiplicand
By 234 Multiplier

936
702
468

Prod. 54756

(4.)

987 Multiplicand
125 Multiplier

4935
1974
987

Product 123375

(5.)

Multiply 1234
By 123

(6.)

4181
41

(7.)

12345
47

(8.)

Multiply 48976
By 94

(9.)

987654
121

(10.)

487658
145

(11.)

Multiply 1475846
By 17

(12.)

9847656
65

(13.)

Multiply 4678594
By 123

(14.)

7865349
847

(15.)

Multiply 9876543
By 1421

(16.)

8765863
63215

(17.)

Multiply 9785448
By 3874

(18.)

7869376
94395

LESSON XV.

PRACTICAL EXERCISES.

1. WHAT cost 125 acres of land, at 75 dollars an acre? At 85 dollars an acre?

2. What is the cost of 464 bushels of apples, at 45 cents per bushel?

3. What cost 1728 pounds of butter, at 24 cents a pound? At 32 cents per pound?

4. If a man travel 37 miles in one day, how far will he travel in 365 days?

5. There are 63 gallons in one hogshead; how many gallons in 128 hogsheads?

6. What cost 125 yards of broadcloth, at 8 dollars a yard? At 9 dollars a yard?

7. What cost 1475 barrels of flour, at 6 dollars a barrel? At 7 dollars? 8 dollars?

8. There are 52 weeks in one year; how many weeks in 12 years? In 13? 14? 15?

9. If a man earn 475 dollars in one year, how much will he earn in 25 years?

10. If a secretary receive a salary of 1475 dollars annually, how much would he receive in 12 years? In 14? 16? 18? 25?

11. If it cost 18465 dollars to sustain an army one day, how much would it take to sustain it 365 days?

12. If sound moves 1142 feet in a second, how far will it move in 60 seconds?

13. The salary of the President of the United States is 25,000 dollars annually; what would it amount to in 8 years? In 16 years?

14. The diameter of the earth is 7920 miles, and the *circumference* is 3 times as much; how many miles is *the earth in* circumference?

SHORT DIVISION.

LESSON XVI.

A. — In performing Division, the number *divided* is called the Dividend, the number divided *by* is called the Divisor, and the result of the division is called the Quotient, or Answer. If, after the operation, anything be left, it is called the Remainder.

B. — To perform Division on the slate, when the divisor does not exceed 12:

I. Write down the figures of the dividend, and draw a line beneath them; then place the divisor at the left hand, drawing a curved line between it and the dividend.

II. Then inquire how many times the divisor is contained in the first left-hand figure, or figures, of the dividend, and place the result immediately beneath. If, after division, there be a remainder, suppose it to stand before the next figure of the dividend, then inquire how many times the divisor is contained in these two figures; and thus proceed until all the figures are divided.

III. If any figure of the dividend will not contain the divisor, write a cipher under that figure, and annex the next figure to it before dividing.

C. — This method of performing Division is called Short Division.

D. — The following example will illustrate the method of operation.

Divide 46827 by 3.

Operation.	Explanation.
Divisor 3)46827 Dividend.	In this operation, we first inquire how many times the divisor, 3, is
15609 Quotient.	

contained in 4, the first figure of the dividend, and find *that it is contained* 1 time, and 1 remainder. We write

the 1 under the 4, and *suppose* the remainder, 1, to stand before the next figure, 6, making the number 16, which contains the divisor 5 times, and 1 remainder. The 5 we write in the quotient, and, placing the 1 before the next figure, 8, we have 18, which contains the divisor 6 times, and no remainder. The next figure, 2, will not contain the divisor, and we place a cipher in the quotient, and annex the next figure, 7, making 27, which contains the divisor 9 times.

PROOF. — Multiply the divisor by the quotient, and to the product add the remainder, and if the result be like the dividend, the work is right. Thus:

Quotient	15609	Divisor 4)1486		Dividend.
Divisor	3	Quotient	371–2	Remainder.
Dividend	46827		4	Divisor.
			1484	
			2	Remainder.
			1486	Dividend.

LESSON XVII.

EXERCISES FOR THE SLATE.

	(1.)		(2.)
Divisor	6)18768	Dividend.	5)1235
	3128	Quotient.	247

(3.)	(4.)	(5.)
7)4876	8)98745	3)186

(6.)	(7.)	(8.)
9)4678	10)68422	12)45678

9. Divide 482 by 2; by 4; by 6; by 8; by 5.

10. Divide 1086 by 3, 4, 5, 6, 7, 8, 9, and 10.

11. Divide 1848 by 8, 7, 6, 4, 2, 5, and 9.
12. Divide 4444 by 4, 6, 8, 2, 5, 9, and 7.
13. Divide 8888 by 2, 4, 6, 8, 10, and 12.
14. Divide 1728 by 12; 144 by 8; 476 by 6; 9846 by 3; 47651 by 7; 4965 by 8.
15. Divide 90807 by 10; 6402 by 4; 789 by 6; 897 by 7; 4004 by 3; 90090 by 2; 8744 by 7.
16. Divide 946421 by 6; 876452 by 4; 876597 by 7; 694214 by 8; 641241 by 9.
17. Divide 1876482 by 4, 5, 6, 7, 8, and 9.

LESSON XVIII.

PRACTICAL EXERCISES.

1. A GENTLEMAN wished to divide 148 dollars equally among 4 persons; how many dollars would each receive?
2. A certain bridge is 963 feet long, and consists of 3 arches of equal length; how many feet in each arch?
3. A teacher wished to distribute 476 books equally among 6 of his pupils; how many would each receive?
4. A school of 648 scholars is divided into 4 equal divisions; how many scholars in each division?
5. An army of 4748 men is divided into 8 regiments; how many men in each regiment?
6. Farmer Brown has 6496 acres of land, divided into 9 lots, each lot containing an equal number of acres; how many acres does each lot contain?
7. A wealthy gentleman left an estate, valued at 475896 dollars, to be divided equally among 4 sons and 5 daughters; how much did each receive?
8. There are 8 furlongs in one mile; how many miles *in 487648 furlongs*?
9. *Twelve inches* make one foot; how many feet *in 4876946 inches*?

LONG DIVISION

LESSON XIX.

A. — When the divisor is larger than 12, it is more convenient to write the various steps in the operation upon the slate, as in the following example :

Divide 47888 by 16.

Operation. Dividend.	Explanation.
Div. 16)47888(2993 Quo. 32 158 144 148 144 48 48 ?	In the first place, we inquire how many times the divisor, 16, is contained in the first two figures (47) of the dividend, and find that it is contained 2 times. We place the 2 within a curved line at the right of the dividend. We then wish to know what is the remainder, and ascertain by multiplying the divisor (16) by the 2, and subtracting the product (32) from 47, and we have 15 remainder. Then, instead of *supposing* this remainder to stand before the next figure, we bring that figure (8) down to the right of the 15, and we have 158. We then inquire how many times 16 is contained in 158, and find it is contained 9 times. We place the 9 in the quotient, and proceed as before, until all the numbers are divided.

B. — From the above illustration we learn, that to perform division when the divisor is larger than 12, —

I. Inquire how many times the divisor is contained *in the first* left-hand figure, or figures, of the dividend, *and place* the result within a curved line at the right of

the dividend. Then multiply the divisor by this figure, and subtract their product from the figures divided, and to the right of the remainder bring down the next figure of the dividend.

II. Divide this number by the divisor as before, and thus proceed until all the figures are divided.

C.—This process is called Long Division, and is *proved* in the same manner as Short Division.

LESSON XX.

EXERCISES FOR THE SLATE.

1. Divide 1487 by 13.	7. Divide 18461 by 13.
2. Divide 4184 by 16.	8. Divide 6842 by 14.
3. Divide 1728 by 12.	9. Divide 4684 by 20.
4. Divide 9872 by 14.	10. Divide 18642 by 17.
5. Divide 8694 by 18.	11. Divide 12345 by 24.
6. Divide 9876 by 20.	12. Divide 78942 by 15.

13. A gentleman had 1468 dollars in bank stock, divided into 14 equal shares; what was the value of each share?

14. A certain railroad cost 436978 dollars, and is divided into 125 shares; what is the value of each share?

15. Divide one hundred forty-seven thousand four hundred and one, by one hundred and five.

16. Divide nine thousand and four, by ninety-seven.

17. Divide nine thousand seventy-one, by three hundred twenty-five.

18. Divide four hundred forty-eight thousand nine *hundred* forty-six, by four hundred and four.

19. A wealthy man divided 4784 dollars equally *among 125 men;* how many dollars did each receive?

LESSON XXI.

PRACTICAL EXERCISES.

1. In one furlong there are 40 rods; how many furlongs in 48760 rods?

2. In one ounce Avoirdupois there are 16 drams; how many ounces in 47894 drams?

3. In one pound there are 20 shillings; how many pounds in 1800 shillings?

4. A man had 4728 dollars, and bought land with it at 25 dollars per acre; how many acres did he buy?

5. There are 52 weeks in one year; how many years in 6492 weeks?

6. A coal-merchant sold 4728 tons of coal in 124 days, and sold an equal quantity each day; how much did he sell per day?

7. If a certain city consume 4892684 gallons of water in 160 days, how many gallons would be consumed in a day?

8. A library containing 4684 books is equally distributed among 24 boys and 16 girls; how many books does each receive?

9. If the divisor is 198, and the dividend 864921, what is the quotient?

10. What is the quotient of 9876542, divided by 4682?

11. In a public procession, there were 69896 persons, who marched in divisions, each containing 420 persons; how many divisions were there in the procession?

12. If the quotient is 12, and the divisor 144, what is the dividend?

13. If the dividend is 1728, and the quotient 12, what is the divisor?

14. In 1 square foot there are 144 square inches; how many square feet in 46842 square inches?

LESSON XXII.

MISCELLANEOUS EXERCISES.

1. A MAN having 4784 dollars, paid away at one time 984 dollars, and at another time 897 dollars; how many dollars did he pay away, and how many had he left?

2. A merchant having several barrels of flour, sold 475 barrels to one man, 684 to another, 325 to another, and had 45 barrels remaining; how many had he at first?

3. Mr. Smith sold his farm for 5486 dollars, and by so doing he made 1842 dollars; how much did the farm cost him?

4. A man was travelling a journey of 4684 miles, and having gone a certain distance, found he had still 1842 miles to travel; how far had he travelled?

5. Two ships start from the same port, and sail in opposite directions; one sails 4872 miles due east, and the other 1896 miles due west; how far then are the ships apart?

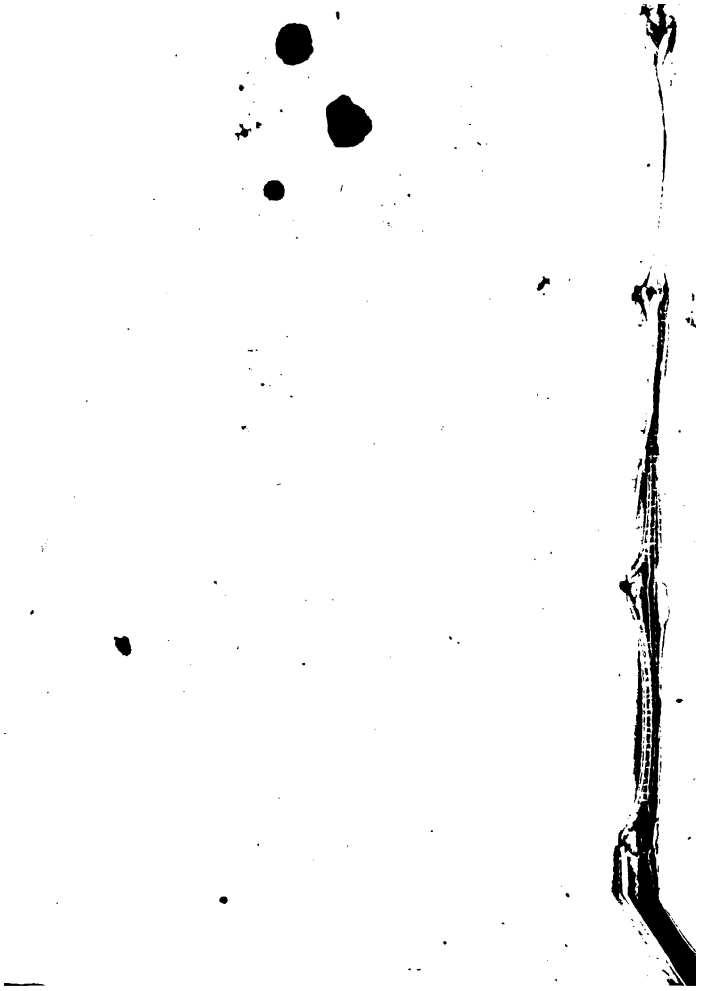
6. Bought 120 acres of land for 40 dollars an acre, and sold the whole of it for 6000 dollars; how much was gained?

7. If a railroad car will run at the rate of 30 miles an hour, how long will it take it to go round the world, the distance being 25000 miles?

8. What cost 864 acres of wood-land, at 125 dollars an acre?

9. A gentleman having 8469 dollars to give for charitable purposes, gave 475 to poor orphans, 684 to disabled sailors, and divided the remainder equally among 25 old soldiers; how much did each soldier receive?

10. Add together 4840, 478, 982; divide the sum *by 140; from the* quotient subtract 18, and multiply *the remainder by 49*; what is the product?



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